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CW at ASM

One Who Did It Tells How To Climb Corporate Ladder

By Marguerite Zientara

CW Staff

BOSTON — A DP manager who understands both the content of corporate information as well as its delivery mechanisms is one who will rise up the corporate ladder.

That's what William R. Synott, senior vice-president of the First National Bank of Boston, told attendees of the Association for Systems Management's annual conference here last week.

Even though the proliferation of desktop computers

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CW Photo by M. Zientara

William R. Synott

Info/Manufacturing



CW Photo by P. Gillin

Action was fast-paced on exhibit floor.

Attendees This Year Bring More Savvy, More Money

By Paul Gillin

CW Staff

CHICAGO — Attendees at the Info Manufacturing '83/Hi-Tech '83 conference held here last week were better informed about the products they wanted and had more money to spend than users at last year's show. They also included more high-level decision makers.

That was the consensus of opinion from five vendors and 10 attendees inter-

viewed on the exhibition floor.

"I've had some pretty serious people here asking a lot of high-level questions," said Paul Hanson, an account manager at Management Science America, Inc. "One man came by with a two-page checklist" of requirements.

The turnout was "the largest we've seen" at an Info Manufacturing show, said Al Lencioni, a sales representa-

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Two Firms Extend OA Lines

•Xerox Corp. Enters Phase 2 of Ethernet

By Bob Johnson

CW New York Bureau

NEW YORK — Calling it Phase 2 of its Ethernet network integration program, Xerox Corp. announced three new office systems here last week:

- A desktop interface unit that allows the Xerox 820-II personal computer to share direct access to Ethernet.

- Version 4.0 of its network software for the Xerox 8010 system and Ethernet-based 8000 network.

- An information system that allows users to create documents and send electronic mail in nine languages.

The Shared Interface Unit (SIU) connects two Xerox 820-II personal computers to the Ethernet network using two industry-standard RS-232 ports. A user can either connect the personal computers directly to the SIU or use a modem to reach it over telephone lines, according to the vendor. The unit connects to Ethernet cable like any other Ethernet-compatible device, Xerox added.

The SIU, including software, is priced at \$1,500 and will be shipped beginning in July.

Version 4.0 of the network software re-

(Continued on Page 4)

•NBI Unveils Systems, Local-Area Network

By Bob Johnson

CW New York Bureau

NEW YORK — NBI, Inc. came East last week to introduce office automation systems for the professional user, make additions to its existing Oasys product line for clerical and personal computer users and bring out a local-area network designed to tie the product families together. The firm also unveiled an Oasys interface for the IBM Personal Computer.

The company's professional system, called System One, is a combination workstation and central time-sharing system server that can be operated in stand-alone mode or in conjunction with NBI's Oasys product line. The desktop workstation includes a Motorola, Inc. 68010 16/32-bit microprocessor with 512K bytes of memory, a "bit-mover" high-resolution CRT screen, keyboard and storage module.

It is capable of handling such applications as data base management, electronic mail, word processing, business graphics, spreadsheets, scheduling, calendars and personal computing, the vendor claimed. In addition, the system can be programmed both in an extended version of Basic and in a Bell Labora-

(Continued on Page 4)

What to Do When Subordinate Isn't Qualified for Promotion? Survey Finds Most DP Managers Say No

By Marguerite Zientara

CW Staff

What does a DP manager do about a subordinate who wants a promotion but is not qualified for it?

Most managers deny the promotion and try to explain to the employee why he is unqualified, an informal *Computerworld* poll of 10 DP managers around the U.S. found last month. In many cases, the frustrated individual eventually leaves the company.

Instances of unqualified people seeking jobs above their level of competence are apparently so common that only one of the 10 managers surveyed had never encountered the phenomenon. Eight of the nine who had encountered the problem said they are adamant about not promoting unqualified employees; the ninth offers a training program to help individuals prepare for higher jobs.

A typical reaction of managers to an unqualified employee who seeks promotion is to tell him, "You are doing what you were hired to do and we feel that what you're making is what you're worth. We feel we're being fair and we hope you'll think it over and be satisfied with it," explained Glenn Greer, vice-president and manager of systems programming for First National Bank of Shreveport (La.).

Do workers lower their sights after receiving such advice? "Some do and some don't," Greer said, noting he has faced the issue three or four times in a period of five or six years. He has on occasion taken a somewhat more conciliatory approach by giving someone a new title that "appeared to be a promotion but where his job didn't change."

Of key importance is a regular, objective appraisal program, according to

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Defense Department Proposes Upgrade Of Washington-to-Moscow 'Hot Line'

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The Department of Defense has proposed upgrading the Washington-Moscow "hot line" to take advantage of state-of-the-art telecommunications capabilities.

The hot line, more properly referred to as the Direct Communication Link, connects U.S. and Soviet leaders in times of crisis. It now consists of teletypewriter terminals linked by two satellite channels with a backup-wire telegraph circuit routed through four European capitals.

Under the new proposal, the hot line would be upgraded by the addition of a high-speed facsimile capability.

In existence for 20 years, the hot line is not a routine diplomatic channel between the two superpowers. However, it has been used successfully a number of times, most notably during the 1967 Arab-Israeli War to prevent possible Soviet misunderstanding of U.S. fleet movements in the Mediterranean and again during the 1973 Arab-Israeli War.

Direct Fax Capability

Another move under consideration is to augment existing diplomatic channels with a Joint Military Communications Link (JMCL) between the two nations, which would provide a direct facsimile transmission capability between the two national crisis control centers. The U.S. center is the National Military Command Center in the Pentagon.

The JMCL would allow "rapid exchange of highly technical information that could be essential to understanding and therefore resolving a nuclear or other military crisis," the Defense Department said. "It could be used in the event of any military incident that required urgent communication between the U.S. and the

USSR but did not warrant direct contact between the two heads of government."

This link would also be useful in implementing the agreements on advance notification of ballistic missile test launches and major military exercises proposed by the U.S. in the current efforts to revive strategic arms limitations negotiations.

In addition, the Pentagon suggested that the two countries consider establishing high-speed data links between the two capitals and their embassies in each others' countries. This would augment the hot line in facilitating communications between the two countries in times of crisis, according to the plan.

The proposals are part of a package outlined in a recent Defense Department report to Congress. The report was mandated in the 1983 defense authorization bill, passed last September, in which Congress directed the Defense Department to study ways to develop "measures for building confidence between the U.S. and the Soviet Union for improved crisis stability and arms control."

Commenting that "a picture is worth a thousand words," Defense Secretary Caspar W. Weinberger said when he presented the proposals

that the introduction of facsimile capabilities to the hot line "would permit the transmission of more information, and more detailed information, than is now possible, including maps, charts and drawings."

Voice, Video Considered

The Defense Department said it had also considered upgrading the hot line with secure voice and video-conferencing facilities but decided, according to the report, that "this step would carry many more disadvantages than advantages." The two countries have always ruled out direct voice communications because they concluded "printed communication would be more private, more precise and more reliable."

The report continued: "Because voice communication is more difficult than written material to translate, it is far more subject to misunderstanding. In addition, a direct conversation could encourage instant response, thereby denying the head of state the necessary opportunity to consult with advisers to prepare a thoughtful and measured response."

For these reasons, the Defense Department said, videoconferencing was ruled out.

Corrections

In the *Computerworld* April 25 Special Report focusing on manufacturing systems, the charts prepared for an article by Bob Ahern titled "Applying MRP II Principles to the Selection, Implementation of Manufacturing Software" were inadvertently omitted. The charts detailed the four major subassemblies involved in an MRP II project: justification, system selection, implementation and an

ongoing review of the operation of the system.

In "Bankpak' Runs on DEC VAX-11" [CW, Feb. 28], the one-time license fee for the Bankpak turnkey software system was listed as \$55,000, based on information received from a vendor spokesman. The correct price is \$60,000, including nine man-days of installation and training.

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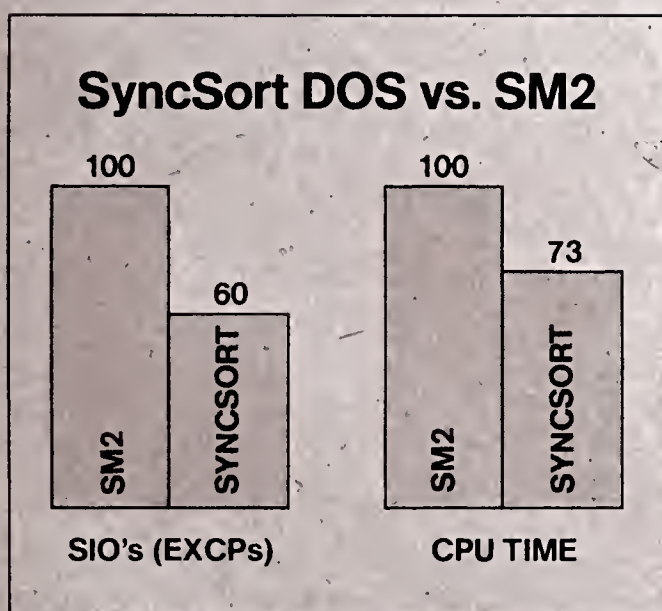
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Hello, sort-racing fans! We bring you this report direct from the main clubhouse here at historic old SyncSort Farms, which has been called "the birthplace of sorting champions."

That glossy young colt you see kicking up its heels out there in the main paddock is the latest in a long line of SyncSort Triple-Crown winners. It's SyncSort DOS, Release 1.6. And it's been causing a sensation around the world's DOS/VS(E) tracks.

Here are some of the top honors it's already captured:

(1) THE PERFORMANCE CROWN: SyncSort DOS, Release 1.6 is a chip off a couple of good old blocks. Its daddy was High Technology, and its mommie was that celebrated brood mare State of the Art.

Like all its famous ancestors, Release 1.6 eats lightly of computer resources but moves very fast indeed. It's bred especially to provide dazzling performance on the 4300 series, with their Fixed Block Architecture and VSAM-type of data.

Compared to that venerable old oat burner IBM's 5746-SM2, Release 1.6 can save you up to 50% in CPU Time and up to 70% in SIOs, as the charts below indicate.

(2) THE PRODUCTIVITY CROWN: SyncSort DOS has always been a favorite with sort jockeys because it's so easy to handle. Advanced features reduce the time required for simple reports from five days to one.

Now Release 1.6 adds another popular new capability. The Sortwriter feature makes it possible to specify reports in virtually any format you require.

With a single pass of the sort, Release 1.6 can manipulate data and present the output in a wide variety of formats — with headings, trailers, totaling and sub-totaling, dating, spacing, line-skipping, character insertion, and data-format conversion.

(3) THE SERVICE CROWN: One of the reasons that SyncSort has over 6,500 users all around the world, is that we look out for the people who use our products. Our Technical Service is fast, accurate and courteous. More than 85% of all customer inquiries are resolved within 24 hours.

If you'd like to see how SyncSort DOS, Release 1.6 performs on your turf, give us a call. We'll be glad to help you set up a little "sortstakes" that will match Release 1.6 against your present sort.

After that improving the breed of your sorts should be no trouble at all.

Managers Won't Promote Unqualified Workers

(Continued from Page 1)

George Priest, senior vice-president of DP for Southland Life Insurance Co. in Dallas.

"If you have a formal appraisal program that has been in place for some time and is objective and is working properly, you can go to specifics based on past appraisals and tell him, 'Hey, Charlie, here's why you're where you are and here's why you haven't advanced.'"

"Typically, though, what happens is that the individual, if he is still frustrated in his hopes of moving on to something higher, will eventually leave and go somewhere else."

One manager who has had good luck with the formal appraisal approach is the management informa-

tions systems (MIS) director for a Minneapolis-based oil exploration company.

"Basically, I'd explain to them that the best use of their skills is in the position they're in," he said. While it is "hard to define" whether someone is happy in his job after such an explanation, "usually they accept it," he noted.

Richard Wood, manager of statistics and planning systems for Alaska Airlines, Inc. in Seattle, has had to turn down unqualified promotion-seekers four or five times in 10 years.

"Normally, in that situation there's no reason to get rid of the employee, because he is perhaps working all right within the proper category. It's just that if he's straining

where he is, it would not be right necessarily to promote that person."

But "there have been other instances where the person was working fairly adequately but not completely up to snuff, in which case the person was replaced," Wood said.

In some cases, explaining why someone didn't get a promotion just does not work.

While constructive criticism may keep someone happy in his job for a period of time, "I don't think that's something you can ever really resolve," remarked Don Schuler, DP manager for Farmer Brothers Co. in Torrance, Calif.

"If a person has it in their mind that they're better than what they are ... you're never really going to con-

vince them [otherwise]."

In one case the problem solved itself. "I got lucky," said Brian Comstock, DP manager for Reed & Prince Manufacturing Co. in Jaffrey, N.H.

"I left and I recommended that they take her out of DP — one of my parting shots," he said. The person in question "ended up leaving the company."

What if Comstock hadn't been so "lucky"?

"Having given her the luxury of floating along at her present level for a period of time, I would have found another place for her outside the department or [let her] take a walk, because it was at the point where it was hurting. She was not progressing at all," he said.

Xerox Corp. Enters Phase 2 Of Its Ethernet Program

(Continued from Page 1)

portedly improves the functionality and performance of the Xerox 8010 workstation by adding new service features to the network and by providing a base for the addition of more network devices, the first of which is the 5700 model electronic printer.

Added capabilities provided by the software include Tables and curvilinear graphics, Xerox said. Tables is a facility that allows dynamic creation of columns and rows for statistical tables and charts and fast forms creation.

Curvilinear graphics reportedly provide curved-line construction, circles and ellipses.

Performance Improvements

Xerox noted that performance improvements were achieved through three actions.

The first is the simplification of user interface functions, such as the introduction of mail "Notes," the storage and retrieval of documents in print format and a new reference icon that is said to eliminate steps in the retrieval of documents.

The second action is the improvement of software elements for the purpose of increasing speed of operations, such as opening and paginating documents.

The third factor is the introduction of an extended memory option with a capacity of 768K bytes.

There is no charge for the 8010's 4.0 software release, according to the vendor.

For a limited time only, there is also no charge for the extended memory option for new 8010 users or for the add-on to existing systems. Availability is immediate.

Language Software

Also introduced was an information system that utilizes the Model 8010 workstation to create documents and send electronic mail using the Model 8010 workstation in Russian, Japanese, German, French, Spanish, Chinese, Italian, Portuguese, as well as in English. It is also possible to intermix text in any combination of the nine languages, the vendor noted.

The 8010 currently supports German, French, Spanish, Italian, Portu-



The Xerox 8010 System

guese and English.

The software addition of Russian will be added at no charge in the third quarter of 1983, as will Japanese at an optional cost of \$1,200.

Chinese software will be available for approximately \$1,200 early in 1984. Japanese and Chinese display fonts and dictionaries are priced at \$800 and a special Japanese keyboard at \$500. A Japanese laser printer is

priced at \$1,000, according to Xerox.

More information on the new 8010 and language software can be obtained from Xerox Office Systems Division, 3333 Coyote Hill Road, Palo Alto, Calif. 94304.

Information on the SIU can be obtained from the company's Office Products Division located at 1341 W. Mockingbird Lane, Dallas, Texas 75247.

NBI Introduces OA Systems, Local-Area Net

(Continued from Page 1)

ties Unix-derived operating system.

Bridging the System One workstation with other workstations and Oasys products is the Integrated System Server. This 68010 microprocessor-based controller with 1M byte of memory provides time-sharing services to intelligent workstations and serves as a manager of printing, filing, communications, the data base, electronic mail and scheduling.

The System One workstation is priced at \$12,500 and will be available in the fourth quarter of 1983. The Integrated System Server starts at \$29,500 and will be available in the second quarter of 1984.

Also introduced here were additions to the company's Oasys product line. They included the Oasys 2000 Series Personal Computing Workstation and the Oasys Interface for the

IBM Personal Computer.

The Oasys 2000 features 256K bytes of random-access memory (RAM), a 14-in. "bit map" display and MS/DOS operating system compatibility. The workstation was designed to attach to NBI's Oasys 64 shared-resource system via the Multinet interface and through asynchronous and Binary Synchronous Communications capabilities. It also features IBM 3270 Systems Network Architecture/Synchronous Data Link Control emulation.

Oasys 2000 can access information in host computers and make it available to other Oasys 64 workstations. As many as 100 personal computer workstations can be connected to each Oasys 64, NBI noted. The System 2000 workstation costs \$2,995 and will be available in October.

The Oasys Interface board allows the IBM Personal Computer to use an

Oasys 64 for access to NBI word processing, storage and archiving. It may be used with either the standard IBM Personal Computer or the XT model and is also compatible with Compaq Computer Corp.'s personal computer. NBI noted that the interface requires at least 128K of RAM to function. It costs \$600 and will be available this August.

NBI also announced the Oasys 4000S stand-alone workstation and Oasys 4000 workstation for clustered systems. Designed for clerical workers, the workstations include the software capabilities of NBI's existing 3000 series.

The stand-alone 4000S features an 8-in. single or dual disk drive with single, dual or quad density. It can also serve as a workstation in NBI's Oasys clustered product configurations. The 4000, without removable storage, serves as a workstation with

the Oasys 8 and Oasys 64 systems. The 4000 and 4000S systems are priced at \$4,400 and \$6,700, respectively.

Finally, NBI introduced NBI Net, an independent local-area network designed to connect the company's workstations, including the Oasys and System One product lines. NBI said that the network can adapt to a variety of physical media, including baseband or broadband coaxial cable and fiber-optic cable. The first phase of the product is a baseband system conforming to the IEEE 802 carrier-sense multiple access with collision detection standard.

Each device connection will cost approximately \$900, and the network will be available during the second quarter of 1984. More information is available from NBI, which can be reached through P.O. Box 9001, Boulder, Colo. 80301.

As Technical Workers Move Up Survey Finds 'Peter Principle' at Work in DP

By Marguerite Zientara
CW Staff

The Peter Principle — from a book of the same name by Lawrence J. Peter and Raymond Hull — states that an individual is promoted until he reaches his level of incompetence. That can happen in data processing when a technical worker moves up to management and is miserable and/or incompetent.

Of the 10 DP managers reached by telephone late last month, only one has not observed that phenomenon. Another recently moved out of a technical position into management himself and has mixed reactions.

Six of the 10 managers interviewed feel the technician who is unhappy in a management position should somehow be moved back into the technical area for the good of the company and for the sake of his own happiness. "In most cases, the best bet is to find a graceful way ... of moving the individual back into a technical position or technical responsibilities," advised George Priest, senior vice-president of DP for Southland Life Insurance Co. in Dallas. "There's typically not any one way to do it." But, "if you're talk-

ing about a long-term, highly valuable employee ... you can even create a spot consulting, as a system engineer or some slot you may not presently have as a face-saving situation.

"In any event," Priest stressed, "you have to have an appraisal system so this guy knows that, by golly, he's not cutting it as a manager, if he thinks he is."

Realize Shortcomings

In some cases, it is no secret that the individual does not like the managerial position. "In other instances, the individual likes the trappings of management and wouldn't want to

give those things up and doesn't realize he's not doing a good job of managing. And there you have to deal with his shortcomings as a manager and get an understanding at that point and then move him on back into the technical area."

As for the recent technician-turned-manager, "Right now in my situation, I haven't really decided yet which way I'll go," explained Lou Ingalls, newly appointed DP manager at Carolina Enterprises, Inc. in Tarboro, N.C.

Having moved up from the area of technical support, "I'm almost assured that I'd want to maintain the technical because I'm very technical-

ly oriented," he said. He noted, however, that evaluating people, for example, is "really pretty easy; I'm a pretty good judge of someone's technical capabilities."

Ingalls has no plans to leave management to return to his former role, but predicted that he may move into technical support management. "The hardest part for me is all the frustration and aggravation that comes as a result of maintaining the existing systems," he observed. "There's a good opportunity here to do lots of development work, but we end up spending a lot of time on maintenance. I really don't like messing with applications."

One Manager Tried Training

In the recent telephone survey focusing on The Peter Principle, only one out of nine DP managers who had encountered the problem took an accommodating stance toward the employee in question.

"I explained I felt he needed additional training in some other areas to be eligible for a promotion and generally those were areas such as supervision and management principles," explained the management information systems (MIS) director of a St. Louis-based manufacturer.

"I suggested a possible work program in which he could supervise a small number of people on a temporary project," he added. "Normally this happens when we have programmer/analysts who desire to become project managers or department managers."

Does the approach work? "It varies," he said. Some people leave the company and seek the position elsewhere; some take some training, lose interest and fall back into the original job; some take the training and do very well; and others take the training and don't do so well, the MIS director explained.

Of those who didn't do well in training, some have left the company and "some we still have with us," he said, surmising, "I think there's a realization by some that they're as high as they're going to go and perhaps in over their heads from time to time."

"I would guess they're not completely satisfied with their jobs, and yet they're unwilling to back down into an area they're more comfortable with," he said. "While they do a creditable job, I think they understand they are at the end of the line."

In this business a company lives to enjoy old age by keeping one principle alive. Staying new.

STRUCTURED DESIGN FOR REAL TIME SYSTEMS (5 Days)
April 4-8 Long Beach
April 18-22 Chicago
May 23-27 Boston
June 13-17 San Francisco
DATABASE ADMINISTRATORS WORKSHOP (5 Days)
April 25-29 New York
May 16-20 London
INTERNAL CONTROLS & DATA SECURITY WORKSHOP (3 Days)
May 23-25 New York
AUDITING STRUCTURED ANALYSIS & DESIGN WORKSHOP (5 Days)
June 6-10 New York
STRUCTURED PROGRAMMING WORKSHOP IN PASCAL (5 Days)
May 9-13 Anaheim
INTRODUCTION TO THE TOOLS OF STRUCTURED ANALYSIS (2 Days)
May 10-11 New York
STRUCTURED ANALYSIS & SYSTEM SPECIFICATION WORKSHOP (5 Days)
April 4-8 Boston
April 4-8 Toronto
April 11-15 Columbus
April 11-15 New York
April 11-15 Salt Lake City
April 18-22 London
April 18-22 Chicago
April 25-29 Houston
May 2-6 Calgary
May 2-6 Ottawa
May 9-13 Denver
May 9-13 Oklahoma City
May 16-20 Amsterdam
May 16-20 Washington, DC
May 16-20 San Francisco
May 23-27 Milwaukee
May 23-27 Birmingham, England
June 6-10 Atlanta
June 6-10 Regina
June 6-10 Phoenix
June 13-17 Copenhagen
June 13-17 Portland
June 20-24 Los Angeles
June 20-24 Miami
June 20-24 New York

STRUCTURED ANALYSIS FOR REAL TIME SYSTEMS (5 Days)
April 11-15 Minneapolis
May 9-13 Boston
June 6-10 Long Beach
STRUCTURED ANALYSIS FOR USERS (3 Days)
April 12-14 Washington, DC
April 18-20 Miami
April 25-27 Toronto
May 2-4 Anaheim
May 9-11 Atlanta
May 9-11 New York
May 16-18 Ottawa
June 6-8 London
June 13-15 Chicago
June 13-15 Dallas
June 20-22 Boston
ADVANCED STRUCTURED ANALYSIS (5 Days)
April 4-8 Ottawa
April 11-15 Amsterdam
April 11-15 New York
April 18-22 Anaheim
May 2-6 Houston
May 9-13 Washington, DC
May 9-13 Salt Lake City
May 16-20 London
June 6-10 Boston
June 13-17 Chicago
June 13-17 San Francisco
June 20-24 Toronto
INTRODUCTION TO THE TOOLS OF STRUCTURED DESIGN (2 Days)
June 6-7 New York
STRUCTURED DESIGN WORKSHOP (5 Days)
April 4-8 Phoenix
April 11-15 New York
April 18-22 Los Angeles
April 25-29 Copenhagen
April 25-29 London
May 2-6 Chicago
May 2-6 Toronto
May 9-13 Atlanta
May 9-13 Seattle
May 16-20 Boston
May 16-20 Edmonton
June 6-10 Washington, DC
June 6-10 Winnipeg
June 13-17 Cleveland
June 13-17 San Francisco
June 13-17 Salt Lake City
June 20-24 London
June 20-24 New York

STRUCTURED QUALITY ASSESSMENT WORKSHOP (2 Days)
April 27-28 New York
May 16-17 Washington, DC
June 6-7 San Francisco
June 9-10 London
STRUCTURED PROGRAMMING WORKSHOP IN COBOL (5 Days)
April 4-8 Chicago
April 18-22 Boston
May 23-27 San Francisco
June 13-17 New York
SYSTEMATIC SOFTWARE TESTING (2 Days)
April 18-19 New York
April 25-26 Los Angeles
May 9-10 Chicago
May 16-17 Houston
June 13-14 San Francisco
June 20-21 Boston
INFORMATION MODELING WORKSHOP (5 Days)
April 11-15 Toronto
April 18-22 New York
April 25-29 Ottawa
May 2-6 Atlanta
May 16-20 Boston
May 16-20 San Francisco
May 23-27 London
June 13-17 Anaheim
June 13-17 Washington, DC
June 20-24 Chicago
June 20-24 Houston
MANAGING PROJECTS IN THE STRUCTURED ENVIRONMENT (2 Days)
April 4-5 Washington
April 18-19 Boston
May 9-10 San Francisco
May 16-17 New York
June 6-7 Atlanta
June 13-14 Houston
June 20-21 Anaheim
PROJECT PLANNING & CONTROL WORKSHOP (5 Days)
April 11-15 New York
April 18-22 Chicago
May 9-13 Boston
June 6-10 Phoenix
June 13-17 Houston
June 20-24 San Francisco

STRATEGIES FOR SOFTWARE DEVELOPMENT (3 Days)
April 18-20 London
May 11-13 San Francisco
MANAGING THE MAINTENANCE EFFORT (2 Days)
April 4-5 New York
April 28-29 London
May 11-12 Chicago
May 16-17 Toronto
June 6-7 Anaheim
June 13-14 Boston
PROJECT & TEAM MANAGEMENT WORKSHOP (3 Days)
April 18-20 New York
April 25-27 London
April 25-27 San Francisco
May 2-4 Toronto
May 9-11 Anaheim
May 16-18 Washington, DC
June 6-8 Chicago
June 13-15 Houston
June 20-22 Boston
FINANCIAL MODELING—A STRUCTURED APPROACH (5 Days)
April 11-15 Washington, DC
May 16-20 New York
June 20-24 Cleveland
STRUCTURED DESIGN & PROGRAMMING WORKSHOP FOR MICROPROCESSORS (5 Days)
April 4-8 Boston
May 16-20 San Jose
June 13-17 Anaheim
MGT. IMPLICATIONS OF STRUCTURED TECHNIQUES FOR MICROPROCESSORS (2 Days)
April 4-5 Anaheim
ADA SOFTWARE ENGINEERING WORKSHOP (5 Days)
April 4-8 San Jose
April 11-15 Washington, DC
June 20-24 San Jose
June 27-01 Washington, DC
STRUCTURED ANALYSIS & SYSTEM SPECIFICATION WORKSHOP FOR MICROPROCESSORS (5 Days)
May 2-6 Anaheim
June 6-10 Boston

STRUCTURED SYSTEMS DEVELOPMENT (1 Day)
April 11 Atlanta
April 22 Washington
May 16 Boston
May 23 Kansas City, MO
June 13 Toronto
June 20 New York
STRUCTURED DESIGN & PROGRAMMING WORKSHOP (5 Days)
April 4-8 Chicago
April 18-22 Amsterdam
April 18-22 New York
May 9-13 London
May 16-20 San Francisco
May 23-27 Boston
June 6-10 Washington, DC
June 13-17 Denver
June 13-17 Toronto
STRUCTURED PROGRAMMING WORKSHOP (5 Days)
April 4-8 Houston
April 18-22 Toronto
May 2-6 San Francisco
May 23-27 Boston
June 6-10 New York
June 20-24 Anaheim
STRUCTURED PROGRAMMING IN COBOL (2 Days)
April 13-14 Washington, DC
June 20-21 San Francisco
STRUCTURED ANALYSIS & DESIGN WORKSHOP (5 Days)
April 4-8 New York
April 4-8 Minneapolis
April 11-15 Calgary
April 18-22 Ottawa
April 25-29 Denver
April 25-29 Washington, DC
May 2-6 Boston
May 2-6 Atlanta
May 2-6 Salt Lake City
May 9-13 Chicago
May 9-13 Toronto
May 16-20 Copenhagen
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Contains Hefty List of Requirements

Mass. Considering Bill to Regulate CRT Usage

By Katherine Hafner
CW Staff

BOSTON — Massachusetts is considering legislation that would regulate the implementation of all CRT terminals. If the bill is passed, employers who want CRT terminals in their companies will have to meet a hefty list of requirements.

Provisions of the Massachusetts bill include:

- Six months advance notice by employers of the installation of CRT terminals.
- Employer-paid annual eye exams for CRT terminal operators.
- "Ergonomically correct" or worker-adjustable workstations and equipment.
- Fifteen-minute work breaks for every hour of work for employees who operate the terminals continuously and 15-minute breaks every two hours for other CRT operators.
- Regular maintenance of CRT terminals to check for excessive leakage of radiation and screen clarity.

Hearings on the bill, H.B. 2658, were held last week by the House Commerce and Labor Committee, where a similar bill died last year. H.B. 2658 was spurred by increasing allegations of health hazards posed

by CRTs.

Studies conducted by the National Institute for Occupational Safety and Health (Niosh) and released in 1981 in the form of a 77-page report, pointed to CRTs as the cause of eye strain, backaches, dizziness and irritability among CRT operators.

Sponsored by Rep. Elizabeth Metayer (D-Braintree) and filed at the behest of the Massachusetts AFL-CIO, the bill has the support of Labor Secretary Paul Eustace, the Massachusetts American Federation of Labor and Congress of Industrial Organizations, the Boston Edison Clerical Workers Union and 9 to 5, a Boston-based organization for female office workers.

If the bill makes its way out of the Commerce and Labor Committee, a process that could last several months, it will go first to the House of Representatives for passage, then to the State Senate.

Massachusetts is one of several states with such legislation pending. Connecticut, Illinois, Maine, Oregon and New York are also considering legislation, though none has been adopted to date.

Speaking at a press conference late last month, Joseph Faherty, presi-

dent of the Boston Edison Clerical Workers Union, estimated that by 1990 some 50% of Boston's clerical workers will be using CRTs.

"Office workers need the bill for their own protection," Faherty noted, adding that only 11% of Boston's 250,000 clerical workers are unionized.

"This legislation is necessary so that [CRT] users in the 1980s will not be the same as asbestos workers in the 1940s," Faherty said.

According to Laura Kenny, a staff member with 9 to 5, last year's bill failed to pass because it lacked the great deal of union support this year's bill has received.

Opposition Widespread

By Katherine Hafner
CW Staff

BOSTON — If state legislation regulating the implementation of CRTs in the work place is passed, the effect on industry in Massachusetts will be "significantly disruptive," the state's largest users of CRTs maintained.

The bill would require that CRT operators take frequent breaks, that employers pay for eye examinations, that workstations be adjustable and that employees be notified six months in advance of CRT installation (see related story). Opposition to the bill, H.B. 2658, is widespread throughout Massachusetts banks, travel agencies, insurance companies, hospitals and publishing houses, where CRT use is

particularly pervasive.

"Why should Massachusetts impose regulations in the absence of any scientific or medical evidence that they're needed?" asked William J. McCarthy, general counsel to the Associated Industries of Massachusetts, one of several industry representatives that testified at an April 20 hearing before the House Commerce and Labor Committee.

"If there were serious health and safety reasons to regulate [CRT] terminals, then Osha [the federal Occupational Safety and Health Administration] would have done something about it," he said.

"So far, Osha hasn't even begun to regulate. It hasn't yet completed or begun to complete its studies of [CRTs]," McCarthy said, whose association represents approximately 2,600 employers in Massachusetts.

"This whole issue has been kicked out of shape," commented George Lynn, vice-president and manager of employee relations for Boston-based Liberty Mutual Insurance Co., whose company uses about 2,000 CRTs.

"The government doesn't have to do everything for us," Lynn maintained. "We've managed rather well until now without politicians telling us how to run our business."

Lynn said Liberty Mutual and other companies have already established in-house regulations for CRT use, such as breaks and eye exams. But others doubt that even these safety precautions are necessary.

Frank Kefferstan, a physician recently retired from John Hancock Insurance Co., accused the bill of being based on erroneous assumptions and ignoring scientific data contradicting claims that CRTs pose a health hazard. "We're getting more complete studies now," Kefferstan noted. "The American Academy of Ophthalmology has conducted a study that shows no hazard to vision and no evidence of cataracts related to CRT use. Ocular fatigue can be avoided by proper use and personalized adjusting of terminals."

John Hancock has been using CRTs since the early 1970s, Kefferstan said, and today about 3,000 terminals are in place throughout the company. The insurer has its own ergonomics awareness committee, as well as a medical staff for employees.

"What we've tried to do all along is work together with employees," Kefferstan said. "Economically, it doesn't make sense for John Hancock not to be concerned about its employees. It's a lot cheaper to keep people healthy."

If the bill passed, it would be at an "incalculable" cost to Massachusetts industries, McCarthy commented.

USPS Pushing for Higher Ecom Rates

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — The U.S. Postal Service last week proposed higher rates for its Electronic Computer-Originated Mail (Ecom) service. If the increase is approved, a one-page Ecom message will cost 31 cents instead of 26 cents and a two-page message will cost 40 cents instead of 31 cents.

In addition, in a bid to expand Ecom's market, the USPS said it no longer will restrict Ecom service to

bulk mailers. To qualify for the 26 cent or 31 cent rate, an Ecom customer must now send at least 200 messages at one time.

USPS also wants to offer Ecom customers the option of enclosing a business reply envelope with their messages. The cost would be 4 cents per envelope.

All of these changes must be approved by the U. S. Postal Rate Commission before they can become effective, a process expected to take several months.

A spokesman for the American Council for Competitive Telecommunications (ACCT), which has been in the forefront of Ecom opposition, said it is "highly questionable" whether the new rates will cover the costs of Ecom. He also contended that the service has failed to live up to its advance billing. Last September, he said, the postal service predicted it would transmit 50 million Ecom messages in 1983. Current usage is far less, he claimed.

In response to those contentions, a USPS spokesman said the proposed rates will generate enough revenue by the end of 1987 not only to cover all direct and overhead costs incurred that year, but also to repay all deficits incurred from the start of Ecom service in January 1982.

Regarding Ecom message volume, the spokesman said the 50 million message figure cited by ACCT is a "marketing goal for 1983," not a projection of actual volume. "We expect the number of Ecom messages carried this year to be in the tens of millions," he added.

During the week of April 9-15, Ecom volume amounted to approximately 287,000 messages, he added. This compares with 106,000 for the week ending June 26, 1982, and 7,015 for the week ending Feb. 26, 1982.

However, Ecom critics maintain that these figures are suspect because they include non-Ecom traffic.

As originally configured, Ecom service connected a user's data terminal to any of 25 serving post offices (SPO) around the country. Messages were to be transmitted electronically to the SPO nearest the recipient, converted into hardcopy at that point, and placed in envelopes. A letter carrier would then deliver each message to the recipient.

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Eastern to Combine Voice, Data in Private Net

By Jim Bartimo
CW Staff

MIAMI — "It's difficult to run a network from the end of a peninsula at the end of the U.S.," Eastern Airlines' manager of data communications said of the company's massive private network that originates here.

It is this difficulty that, in part, has led to Eastern's plan to combine its voice and data transmissions over the next six months. "About four months ago, we started a study to see where the industry was going," Jim Weiss said in a recent interview.

"We saw that a combination of voice and data over the same line was necessary. We found we weren't competitive," he said.

Formidable Network

Eastern's data network is formidable. More than 11,000 terminals are linked to some 2,300 processors. The terminals and processors, most of which are members of Raytheon Data System Co.'s PTS-100 family, handle reservations and information for Eastern and for network customers that include travel agencies and smaller commuter airlines.

Dedicated communications lines come into Eastern's computer center, called System One, under an IBM Systems Network Architecture. The data communications department shares the same building with the System One data processing center.

Combining voice and data will allow Eastern to decentralize the administration of its network. Service and installation for the hubs currently branch out from Miami in much the same way the communications lines do. "The hubs will have regional service when we combine the network," Weiss said. "We'll move our installers out to the field and train the data professionals in voice and the voice professionals in data."

Eastern's System One Direct Access (Soda) network for travel agents has been a major factor in the need for a newly designed network. "Soda accounts have doubled in the last year, and they will double again next

year," Weiss said. Combining voice and data will allow Eastern to serve its network customers better by offering enhanced service and access.

Administrative Reorganization

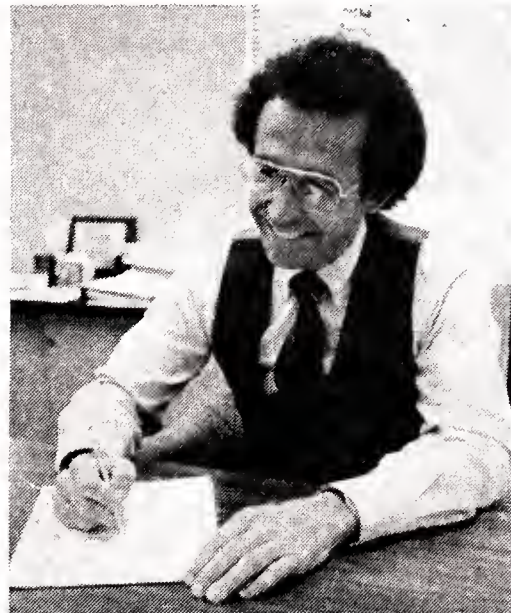
An administrative reorganization as well as a technical one will accompany the combination, Weiss said. The old structure kept the 27 telecommunications professionals separate from the 110 members of the data communications department. Under the new structure, the groups will be combined and Weiss will become head of facilities, overseeing the reservation systems and the installation of communications equipment.

Weiss will still report to the direc-

tor of communications who, with the directors of data processing, reports to the vice-president of computer and communications services. According to Weiss, it is not unusual for data communications and data processing to be on equal organization levels when a network the size of Eastern's exists in a company.

The change in network structure is part of an ever-changing facility, Weiss maintained. Future projects include upgrading the existing 9,600 bit/sec modems and the introduction of a new polling method to increase the number of drops on the network with no decrease in response time.

"All of this is planned to take place within the next 12 months," Weiss said.



CW Photo by J. Bartimo

Jim Weiss



College Opens Research Center

COLLEGE PARK, Md. — The University of Maryland will inaugurate today a Center for Automation Research, planned as a regional and national center for the study of automation, robotics and productivity technology.

Composed of laboratories devoted to research the center has three goals: to conduct research in all aspects of industrial and business automation, to establish collaborative relationships with corporate and industrial affiliates, state and federal government agencies and to develop interdisciplinary educational programs.

University computer science professor Azriel Rosenfeld, director of the center, said the organization is needed because "if the United States does not aggressively begin to put robots to work in our plants and factories now, then we are doomed to becoming a second-rate economic power."

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DEC Ties VAX Superminis in Local Network

By Susan Blakeney
CW Staff

MAYNARD, Mass. — Promising high system availability, high data integrity and a simple, modular growth path for high-capacity applications, Digital Equipment Corp. last week unveiled Vaxcluster, a computing concept that hooks together its VAX-11/780, VAX-11/782 and VAX-11/750 superminicomputers, as well as peripherals, in a proprietary local-area network.

Computers in a Vaxcluster are linked via a high-speed, dual-path Computer Interconnect (CI) bus that reportedly can handle data at rates up to 70M bit/sec, nearly four times as fast as Xerox Corp.'s Ethernet, another local-area network supported by DEC.

The CI bus — just introduced for DEC's VAX-11/750, but previously available for the firm's larger 11/780 processor — has a dual redundant data path consisting of two transmit cables and two receive cables. It reportedly accommodates up to 16 nodes in a computer room environment or up to 16 VAX computers.

Each processor is connected to the CI bus via an intelligent CI interface, which dictates which line in the dual-path bus to access. Cluster throughput is enhanced when utilizing both paths because if either path becomes unavailable, traffic is automatically shifted to the remaining path, a DEC spokesman said.

Processors and peripherals are linked to the CI bus via DEC's recently unveiled Star Coupler, which is a

common connection point for all nodes in a Vaxcluster configuration. The Star Coupler accommodates CI cables with a maximum length of 45 meters, while the CI network is limited roughly to the distance of a football field, according to DEC.

Also integral to the network configuration is the firm's Hierarchical Storage Controller (HSC50), which was designed to link DEC RA60, RA80 and RA81 high-capacity disk drives to the Vaxcluster network, the spokesman said. The HSC50 is reportedly capable of handling multiple, simultaneous operations on several drives and will optimize physical operations to maximize throughput. In addition, it can also relieve the hosts of utility operations such as volume shadowing and back-

up to disk or tape, the spokesman explained.

The HSC50 is compatible with Decnet's DDCNP, X.25/Systems Network Architecture and Ethernet protocols. Each HSC50 subsystem will support any combination of up to six disk channels.

In addition to providing for system growth, support for more users and increased availability, the multi-system along with the use of multiple copies of VMS throughout the network, allow for checkpointing and recovery (see related story).

system which, along with the use of multiple copies of VMS throughout the network, allow for checkpointing and recovery (see related story).

The Vaxcluster system is also geared to shift processing weight from one failed processor to another one that is functioning.

Pricing on the intelligent CI interface is \$19,500 for VAX-11/780 and VAX-11/782 systems and \$18,500 for the VAX-11/750 version. The CI bus cable sets are priced according to length. For example, a 10-meter bus costs \$600 and a 45-meter bus costs \$1,460.

The Star Coupler, equipped to receive eight nodes, costs \$7,500, while an upgrade kit for expansion to 9 to 16 nodes is \$5,500. The price of the HSC50 storage controller is \$32,500. Additional disk channels are available for \$7,100 per channel.

More information on Vaxcluster is available from DEC headquarters in Maynard, Mass. 01754.

Vaxcluster to Run Under Updated VMS

MAYNARD, Mass. — Digital Equipment Corp.'s Vaxcluster operations will be managed under new versions of the vendor's VMS operating system that will be released immediately.

VMS Version 3.3, which provides hardware support for clusters of VAX-11/780 and VAX-11/782 processors and shared access to the HSC50 subsystem with RA60, RA80 or RA81 disk storage, is currently being made available. Version 3.4, which extends support to include the vendor's VAX-11/750 processor, will

be available in August, DEC said.

The operating system software will reportedly provide global sharing through a distributed file system that extends file-level access to all disk storage, a distributed lock management facility that reportedly synchronizes file access and a mass storage protocol that gives cluster access to locally connected mass storage. VAX-11 Record Management System will use these facilities to permit clusterwide access, the vendor explained.

The software's common journal-

ing facility reportedly records all changes in the state of a file, providing an audit trail and a means to roll back or forward files to a stable state. The recovery unit facility specifies sets of data base operations to be processed as units in order to retain data base consistency, according to the vendor. Therefore, if a failure occurs within a unit, files can be restored to the state immediately preceding that unit, DEC said.

In addition, checkpoint/restart, which is also built into the software, protects lengthy computational tasks against host computer failure.

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Attendees Savvier This Year

(Continued from Page 1)
tive at NCR Corp. "People seem to be more interested in buying."

Nine of the 10 users interviewed were attending their first Info Manufacturing show; eight were planning to buy at least some new manufacturing products in the near future.

Bar code readers, data collection systems and shop floor control systems rated high on their shopping lists.

The 3M Corp. sent about 40 people to the conference, according to Roger Oehler, a 3M systems analyst. Oehler was looking for bar coding and data capture tools and had been attracted by products from Printronix, Inc. "We're ready to buy; we just wanted to investigate a little more," he said.

An executive from a company that installed a Hewlett-Packard Co. material requirements planning (MRP) system last October was seeking "ideas for shop floor control and general productivity improvements, anything that will assist us now that we've got MRP." Carl Bachhuber, vice-president of administration at Mayville Engineering Co. in Mayville, Wis., said the MRP system "has resulted in savings of several million dollars," even though the system is not yet fully operational.

Several users said they were pleased with the range of products represented at the show. "Everybody's looking for a one-stop place to get smart," said Caleb Swanson, president of Air Quality Products, Inc.

"It's a good representation of any-

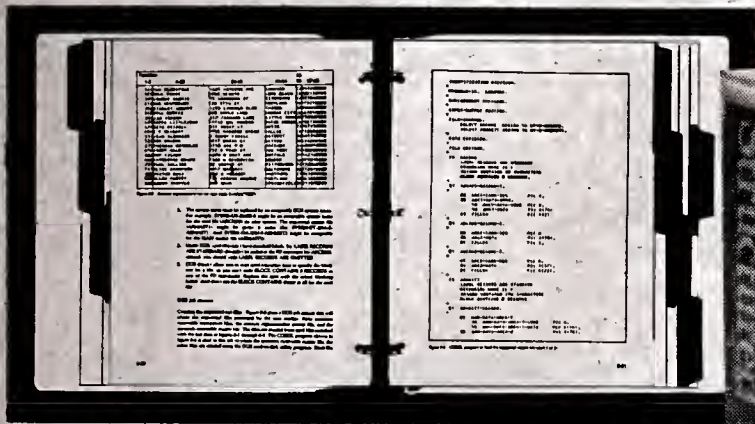
thing you'd want," said David Sterna, DP manager at Atwood Vacuum Machine Co. in Rockford, Ill. He said that he was on the lookout for bar coding products and that his company was planning to buy in the near future.

Another potential buyer at the show was John M. Bankhead, manager of microcomputer technology at M. Lowenstein Corp. in Rock Hill, S.C. The company "could be talking about a fairly large project" to automate manufacturing in the near future, he said, and was in the market for bar code readers, data collection and software systems.

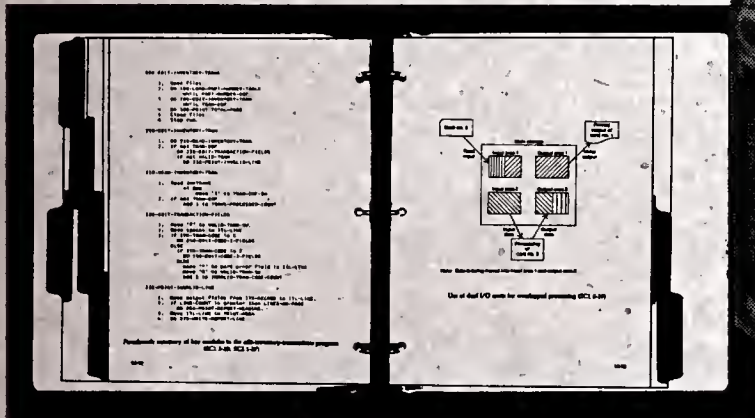
However, not every attendee was enthralled by the exhibits. "I can't say I'm overly excited," stated Stuart Gelber, manager of field support at G.I. Foods Corp. in White Plains, N.Y. "There's nothing new I've run into," Gelber was "just looking to see where the momentum is," he said, adding, "It clearly is on using microcomputers in MRP, bar graph coding and data collection."

An administrative manager for an energy company in Baltimore called the exhibit floor "very impressive," but expressed disappointment that few products were available for her process-related industry. "I'm looking for preventive maintenance products and I haven't seen anything except from [ASK Computer Systems, Inc.]," Betty L. Fowler of Schwarzschild, Inc. said. Her company is currently running on time-sharing and "will be buying a major system soon."

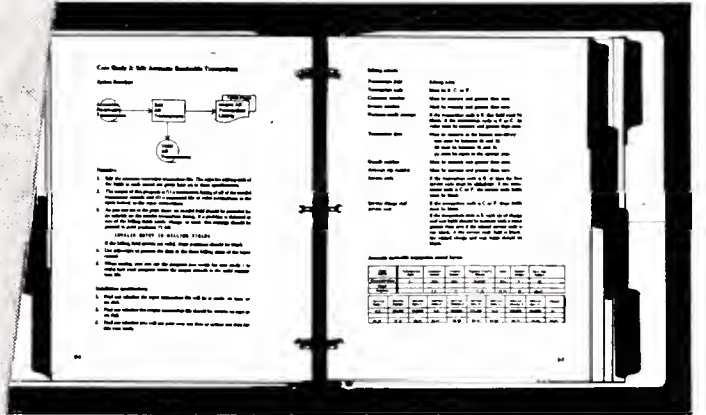
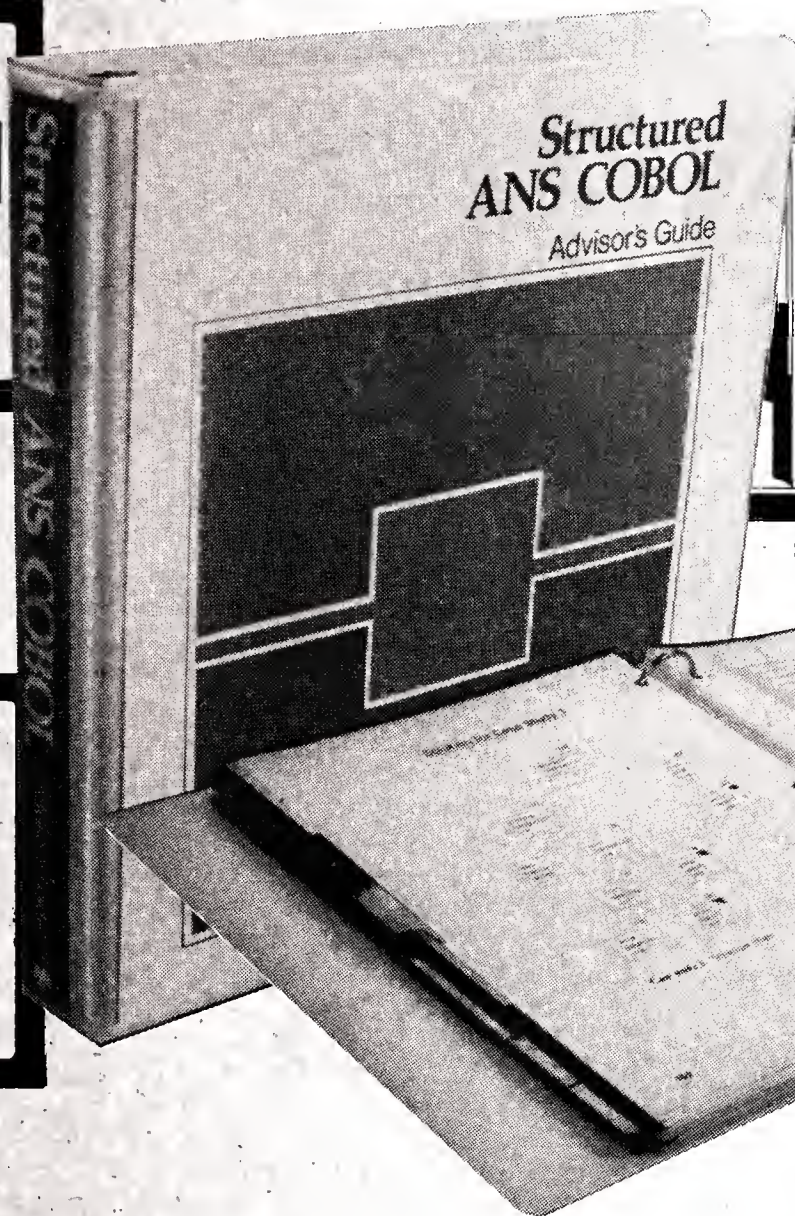
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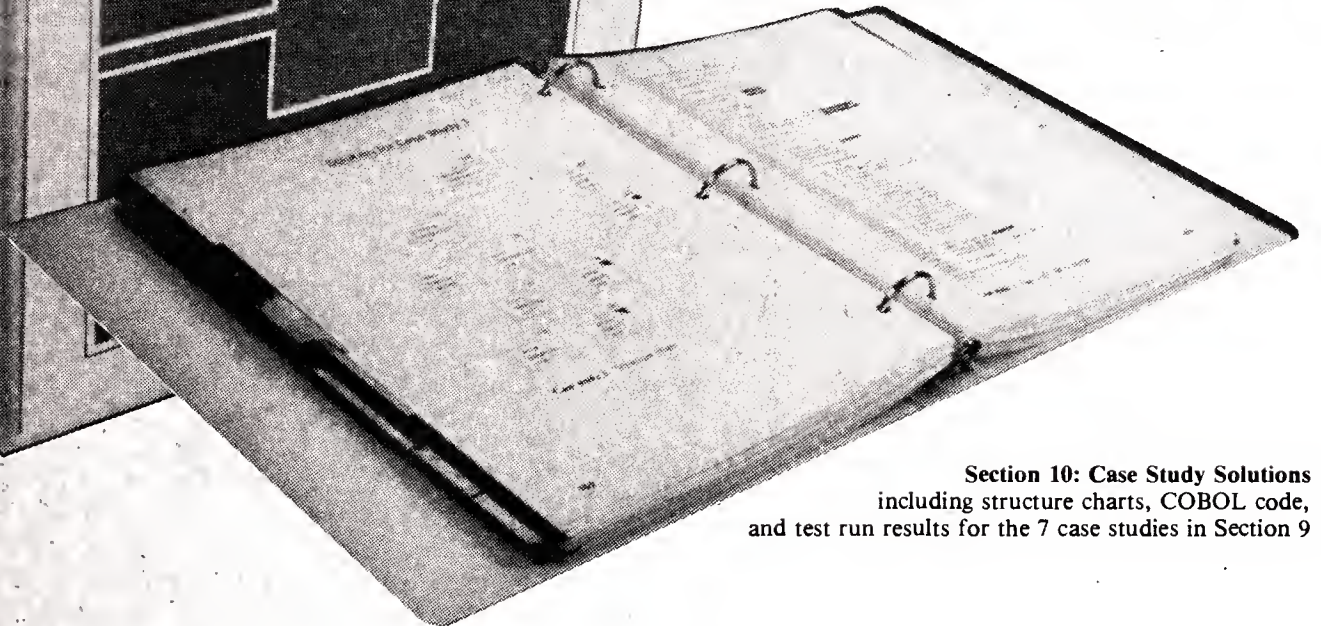
Section 8: Case Study Administration...everything you need to administer the case studies in Section 9, including test data



Section 14: Transparency Masters for making overhead projector foils for class presentations



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COB-2

MSS Seen Defying Old Info Planning Methods

By Paul Gillin
CW Staff

CHICAGO — "Traditional information systems planning approaches don't work" when the subject is a management support system (MSS), according to consultant Gary K. Gulden, vice-president of Index Systems, Inc.

"Traditional methods assume structure and predictability. They tend to be supply- and delivery-oriented and also control-oriented," Gulden said. "But the management support system cry is 'power to the people,'" he added, a factor that throws predictability to the wind.

Leading a session on managing management support systems at last week's Info Manufacturing 83/Hi Tech 83 conference here, Gulden called management support systems "the high-growth segment of the information systems portfolio."

Management support systems generally include decision support or executive information systems that are available on microcomputers or terminals. Gulden's company has identified about 80 such products on the market, and he said end-user computing demand is increasing at the rate of about 50% per year in most companies.

The problems for DP stem from the fact that personal computers are "in," Gulden said. "Somehow it's okay to have a personal computer on your credenza rather than a terminal." Microcomputer acquisitions are

CW at Info/Manufacturing



CW Photo by P. Gillin

Gary K. Gulden

running out of control because "they work, they have a following, people like them. That stimulates demand."

Ironically, the executive thirst for more information is creating a demand for more mainframe capacity, Gulden observed. "IBM is seeing an upswing in the demand for large computer resources," he said.

Three Case Histories

Gulden offered case studies of three unnamed companies that took very different approaches to managing management support systems.

Company A is a large, progressive

firm with many bright analytical employees and a strong functional organization. The company entered the end-user computing market early, electing to provide "all the data and tools you could want," on both microcomputers and the mainframe. DP made itself available for advice and support through a hot line, charging services on a usage basis.

The result was a 50% annual growth in demand for the data center from end users, Gulden said. As of last summer, the demand was increasing by the capacity of one IBM 3033 mainframe every six months.

"To offer this kind of environment to people with that [analytical] orientation was like throwing meat to the lions," Gulden said.

Senior management soon began to see end-user computing as "an analyst's playground," the consultant said. "They were losing track of the business value of these systems. Management called DP in and slammed a lid on the budget until they could begin to manage the growth."

In contrast, Company B is a conservative, control-oriented firm that also entered the management support system arena early. Management focused on areas of high business value and a special staff was created of the sharpest people within

DP "to act as the high priests of decision support," Gulden said.

The staffers did good work and within three years most of the management support systems were "chauffeur-driven" with some menu support. "Then people began to ask, 'When's my turn? I want to drive,'" Gulden recalled. "They began to see it as just another form of DP backlog."

The users revolted and started computing on their own. "A lot of control motivation had to go out the window," Gulden said.

Company C, which was "recognized as being one of the best managed companies in the country," adopted management support systems late. "They were very much demand-pull-oriented," Gulden said. "One veteran executive was put on the problem in close contact with DP."

The manager looked at many other cases and studied the market carefully. Then he went to senior management with a \$1 million allocation request and a list of reasons why the expense would pay back. He also advocated implementing the systems at the executive level first and seeing where that strategy led them.

"The executives went right in the tank for that \$1 million," Gulden said. "The prototype program is being considered successful now and the system is being brought in-house. Their worry now is that the demand wave will really hit."

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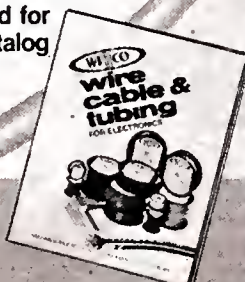
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More Labor Utilization, Less Lead Time

Analysis Seen Needed to Reap MMS Benefits

By Paul Gillin
CW Staff

CHICAGO — Increased labor utilization and reduced management lead time are two benefits that can result from successfully implementing a manufacturing management system (MMS).

In order to reap those benefits, however, it is necessary to "find out where you are before you decide where you are going," William T. Muir, a partner in the Chicago office of Price Waterhouse & Co. emphasized here last week. Muir outlined recommendations for developing MMS at the Info.Manufacturing 83/Hi-Tech 83 conference.

Muir told his audience to analyze current practices and strategies by querying the system's ultimate users. "If disagreements emerge, now's the time to resolve them," he said.

The next steps are to develop a conceptual blueprint of exactly what the MMS should look like and to get management approval before proceeding any further.

Although Muir admitted that this process involves a lot of time and effort, he said, "If you go out and spend the resources to set the stage correctly, you're probably going to avoid many times the cost downstream in redoing and redoing the process."

In defining information requirements, Muir cited several areas to consider:

- **Processes.** Are parts frequently unavailable even though the inventory is turning over? How should bills of materials be structured to plan and control production and inventories most efficiently? What steps need to be taken to control physically inventories? Do you know exactly how the product gets to each stage of production and what occurs there? What level of detail is needed in the routings to ensure effective control?
- **Operations and organizational policies.** Are you building finished goods or partly finished goods? Do you have one plant or several? Do your people know and agree upon policies? "You'd be amazed at the number of different opinions you would get on a policy," Muir said.
- **In addition, what are your business' key success factors and how are they measured?** Are the existing practices following the existing policies? "If you're going to use a formal system, make sure everyone is using it or you're going to get a variable product and variable processes."
- **Existing information systems.** How are interdepartmental relations between them? How effective are the applications in place? Should you modify or replace them? Evaluate software based on those requirements, Muir said. It is necessary to formalize existing business objectives and policies, which involves knowing some strategic planning.

Know what your processing methods are and what they should be, he added. Do you want net changes or are you happy with current trends? Make sure information flows are consistent with product flows. Should you change your practices to

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fit available software? "Sometimes this is a good idea," he said.

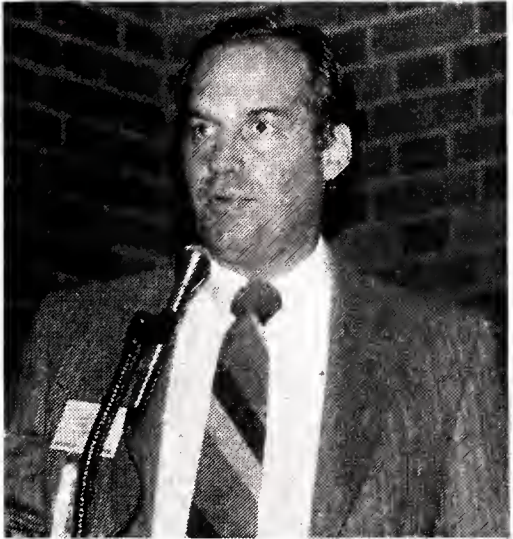
Finally, when you understand the requirements, go to management with a plan that lists current policies, objectives and recommendations, he said. Painful as it may be, be prepared to offer a cost/benefit analysis.

Muir told his audience to select a software vendor with a track record and support offerings in mind. He also urged them to make price their

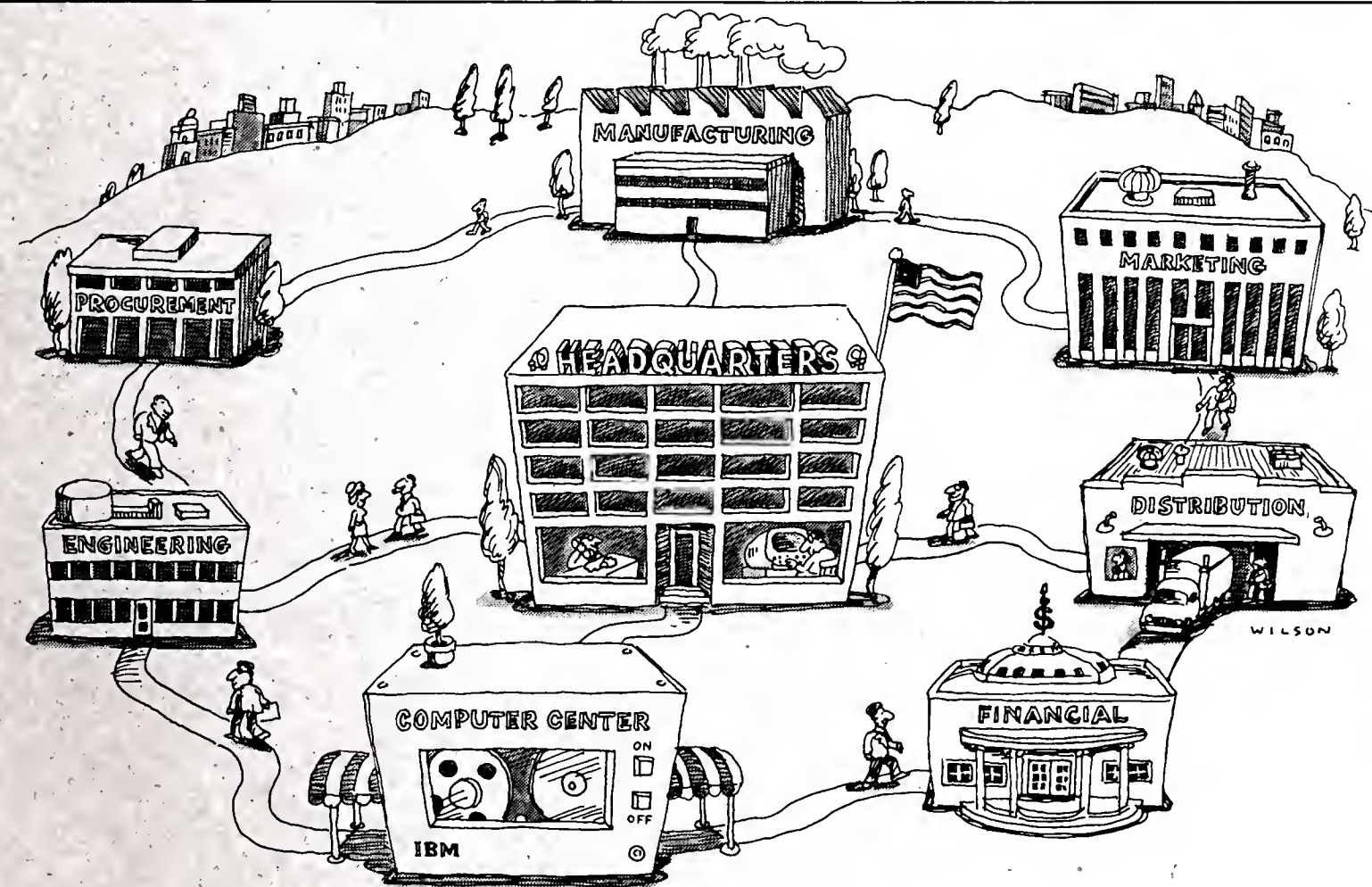
lowest priority of consideration.

Implementation should include plans for project organization, project management, training and education and user procedures, Muir said. "You honestly should consider a steering committee" made up of representatives from every function impacted by the project, Muir said. "But the implementation itself should be the responsibility of one project manager," usually a higher level operational person.

Be realistic about time frames, Muir said. Almost any MMS will take 12 to 18 months to install. Be skeptical of vendors who promise paybacks beginning in two or three months.



CW Photo by Paul Gillin
William T. Muir



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Martin Marietta Leads Product Parade at Show

By Paul Gillin
CW Staff

CHICAGO — Martin Marietta Data Systems, Inc. capped a diverse line of product announcements at the Info Manufacturing 83/Hi-Tech 83 conference held here last week by unveiling a modular family of manufacturing software products that are said to be portable across hardware from three vendors. The company also announced that it will act as a value-added remarketer for the IBM 4321.

The company expanded its Modular Application Systems manufacturing system to run on IBM mainframes and 4300 series computers (including the IBM SSX operating system), Digital Equipment Corp.

CW at Info/Manufacturing

VAX-11 minicomputers and Hewlett-Packard Co. HP 3000 minicomputers. The system is also available through Martin Marietta's remote computing service centers.

The firm also introduced integrated payroll, personnel and project planning software packages, all portable across the same range of hardware, except project planning, which does not run on the HP 3000.

Payroll features include transmittal, payroll register, paycheck or statement of pay, tax listings, W-2 forms and 941 reports. Personnel addresses benefits administration, la-

bor relations, training skills inventory, applicant reporting, manpower planning, wage administration and government requirements.

Project planning includes network scheduling, multiple resource allocation, tracking and projection, what-if analysis and graphics. Prices vary depending on modules purchased and hardware. The manufacturing system ranges from \$21,000 to \$75,000; payroll ranges from \$19,000 to \$39,000. Personnel ranges from \$19,000 to \$73,000 for an on-line IBM configuration. Project planning costs from \$100,000 to \$150,000. The com-

pany is located at 6303 Ivy Lane, Greenbelt, Md. 20770.

A local-area network-based system for manufacturing resource planning (MRP) was unveiled by Digital Microsystems, Inc. Called Hinet/MRP, the integrated hardware-software system consists of a Digital Research, Inc. CP/M-based local-area-network, full-function MRP software, office automation and business graphics software and training.

The system provides five workstations (expandable to 32) and a closed-loop set of MRP modules for bill of material processing, inventory control, sales order entry, material requirements planning, purchasing, shop floor control and cost control. The basic configuration is priced at \$39,950 with availability in June from 1755 Embarcadero, Oakland, Calif. 94606.

DBSI Information Systems, Inc. introduced a closed-loop MRP II/Financial System for the Texas Instruments, Inc. Business System 300 series of minicomputers. Individual modules include product definition, purchasing/receiving, production control, inventory control, material planning, production planning, accounts payable, general ledger, accounts receivable, order processing, sales analysis and word processing. The base price of the package is \$49,995 from DBSI at Twelve Oaks Center, 15500 Wayzata Blvd., Wayzata, Minn. 55391.

A series of microprocessor-based products for high-volume process data collection and statistical trend manipulation was introduced by Orthstar, Inc. The Integrated Data Acquisition System (Idas) family runs on Digital Equipment Corp. VAX-11 and PDP-11 series minis.

Idas-100 relieves the up-link host of real-time data gathering by collecting and preprocessing data. The package accepts analog input from the manufacturing unit or process, compares against tolerance ranges, statistically sums the values and uploads the data to the polling host.

Idas-200 is a stand-alone version of Idas-100 with a keypad or CRT terminal connection for operator entry of parameter information. Idas-300 is a version of Idas-200 with extended discrete I/O and control output capabilities. Prices start at \$15,000, including software for communications from the host to the micro and software for calculation of mean and standard deviations on the host from Box G, Elmira, N.Y. 14905.

A matrix printer capable of generating bar code labels, block letters, graphics or text in any combination was announced by Dataproducts Corp. Called the M-100L, the 140 char./sec printer has built-in intelligence that eliminates the need for external controllers.

Nine standard bar codes are built in. The printer can generate horizontal and vertical lines of varying lengths and thicknesses, and the feature can be used in conjunction with other printing to generate labels, tickets and tags.

Pricing with serial interface is set at \$4,200, including a two-year warranty and a one-year print head warranty from 6200 Canoga Ave., Woodland Hills, Calif. 91365.

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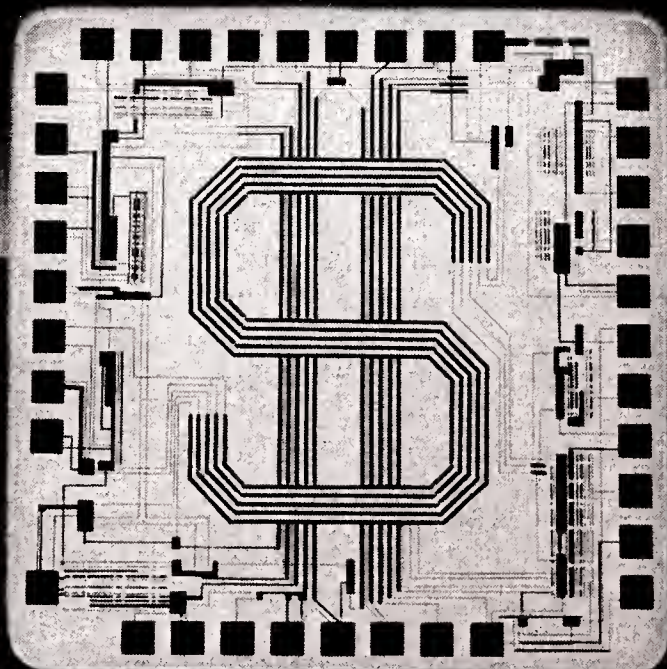
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Study Findings Released

DP Their Most Vexing Problem, Execs Say

By Lois Paul
CW Staff

ANN ARBOR, Mich. — Asked to list the three major internal control risks faced by their companies, 670 top executives reported that 61% of their problems revolve around data processing.

That is one result of a study conducted recently by the University of Michigan's Graduate School of Business Administration under the sponsorship of the Financial Executives Institute.

The study was undertaken to examine some of the concerns and insights that executives in American corporations had shared with university researchers over the past four years.

Detailed Findings

Dr. Dennis G. Severance, professor of information systems at the University of Michigan, detailed the findings of the report and similar research before approximately 240 attendees at The Conference on Information Centers and Fourth-Generation Languages.

The conference was held here recently by University and Database Design, Inc.

According to Severance, executives told the university researchers that they simply did not feel good about DP and this was a gut feeling rather than an opinion based on facts and figures.

Concerns Expressed

They expressed concerns about their firms' great dependency upon computers, as well as their frustration about the applications backlog.

"A concern I have is that we are losing control of the use of computers in this corporation and nobody is responsible" is the way Severance paraphrased some of the responses to the survey.

The researchers also went to 15 organizations whose DP departments are considered well-managed.

They asked several groups of executives at each firm what advice they would give their children about how to determine if the person in charge of DP is doing a good job if their children were appointed chief operating officer (CEO) of a major company.

The CEOs and executive vice-presidents said they would advise their children to do four specific things: resist the vendor hard sell, handle DP problems just like any other business problem, learn to understand the problem (use consultants and get education as necessary) and assign responsibility and duties to a competent subordinate.

Understand the Problem

Chief financial officers, chief administrative officers and chief planning officers also stressed the importance of understanding the problem.

They suggested finding a good general manager who understands technology, as well as advising the development of long range plans and the employment of computer system standards and procedures.

"Do not start by buying hardware," they said, noting that part of

the solution is development of business standards and procedures similar to those used in other areas of business.

Identical Advice

The advice from the chief information officer was almost identical to that from the other two groups:

- Understand the problem.
- Employ computer standards and procedures.
- Find a manager who understands both the business and the technology.
- Establish responsibility and controls for line managers.

"Nothing is going to happen un-

less the guy at the top does something," Severance said, summarizing the study's findings.

Severance told the executives assembled at the conference that if they agree with the study's findings and essentially are following its advice they should take heart.

"To the degree that you agree and are not doing it, perhaps you can use it as a lever," he said.

Further information about the full report of the study can be obtained by contacting Dr. Dennis G. Severance at the Graduate School of Business Administration, The University of Michigan, Ann Arbor, Mich. 48109.



CW Photo by L. Paul

Dr. Dennis G. Severance

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Speaker Tells What It Takes to Reach the Top

(Continued from Page 1)

has brought a move toward decentralized data processing, "I don't see the management of DP as being decentralized," Synott said. "Corporate information must be centrally controlled to make it all flow together and make sense."

DP managers who understand both content and technology may accede to the future title of chief information officer (CIO), reporting directly to the chief executive officer, he suggested.

In an effort to control corporate data, the First National Bank has established a Personal Computer Center that offers a hands-on "laboratory," central purchasing facility, consulting services, training and support, a software library and customer services. Technical services include installations, available spare parts, hardware servicing, availability of loaner machines and help with programming problems.

"But we don't do programming," Synott stressed. "A personal computer is a do-it-yourself proposition."

Preparing for the invasion of business-oriented personal computers requires "demonstrated information systems leadership, information resource management strategic planning, a specified corporate policy and a specific support strategy," he said.

As part of the bank's proactive attitude toward personal computers, the Information Systems and Ser-

CW at ASM

vices Division (IS) first got the support of top management by stressing the problem of control. "Especially in a banking environment, that is a major concern," Synott noted. "It becomes a big problem when reports contain erroneous, outdated or wrong data and people make business decisions on that data."

With top management support, IS focused on limited vendors, established guidelines for personal computer use, established a formal support function, determined the services to be offered, organized training courses and planned a kick-off program.

As part of the process of establishing a centralized personal computer base, it is up to top management to approve policy and funding; to the CIO to coordinate personal computer usage and hardware and software selection; to the user to justify his use of a personal computer, increase his computer literacy and learn about security and controls; and to the auditor to see that all is secure and auditable.

"Lest I have made it look all rosy," Synott noted, "be assured there are a lot of problems" in bringing in personal computers. With all the different vendors and products, "you need to have the image of the resident expert and it takes a lot of work to build

that up, with a lot of presence in the organization."

As for personal computer misuse, "If someone is using a personal computer fewer than 10 hours a week, he should be going to the lab instead."

Users also should not be using personal computers to play games or for personal work, according to Synott.

With so few equipment standards within the computer industry itself, a manager must develop his own system of hardware, software and communications compatibility, Synott said. "That is not done by many organizations," he said.

Other problems include security, controls, data integrity and software validation.

Call for Papers

IEEE COMPUTER SOCIETY 1983 CONFERENCE ON SOFTWARE MAINTENANCE WORKSHOP, Monterey, Calif., Dec. 6-8.

The workshop will address the broadest selection of approaches to software maintenance. An appropriate presentation could be a case study, a theory, a methodology, a management technique, an experiment or a piece of software. Suggested paper topics include definitions and scope of software maintenance, design approaches for providing maintainable software, tools for software and data base maintenance, program evolution, software maintenance and testing practices, management and measurement of software maintenance and understanding and documenting software.

Authors should submit six copies of a digest, 1,000 words or less, in English by July 1 to Prof. Norman Schneidewind, Code 54, Naval Postgraduate School, Monterey, Calif. 93940.

ASCUE 16th ANNUAL SUMMER CONFERENCE, Upland, Ind., June 13-15.

Ascue members and others are invited to submit papers for presentation. Presentations are not limited in scope but should focus on academic and administrative computing topics that would be of interest to small colleges. Suggested topics include microcomputing on campus, developing courseware for micros, linking minis-

and micros into local-area networks and faculty development strategies.

Authors should submit papers to Prof. R. Waldo Roth, Ascue Conference Program, Chairman, Taylor University, Upland, Ind. 46989.

IEEE/PES TRANSMISSION AND DISTRIBUTION CONFERENCE, Kansas City, Mo., April 29-May 4.

Papers are being solicited to be presented and discussed during the technical sessions of the conference. The conference will be held in conjunction with the IEEE/PES Exposition at Bartle Exposition Hall in Kansas City.

The theme of the conference will be "New Horizons," which is a logical extension of the previous conference's discussion of "Impact of Change on Tomorrow's Transmission and Distribution Systems."

The scope of the conference includes insulated conductors, power systems communications, power systems engineering, power systems instrumentation and measuring, power systems relaying and substations.

The deadline for receipt of the author's declaration of intent form is July 1, 1984. The deadline for receipt of original manuscripts is Nov. 4. Prospective authors should request an author's kit from IEEE Headquarters, PES Special Activities, 345 E. 47th St., New York, N.Y. 10017.

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CW033

People, Machines to Share Role Speaker Envisions Programmer of the Future

By Marguerite Zientara
CW Staff

BOSTON — Will the programmer of the future be a person or a machine?

In all likelihood, the answer is both — or a balance between the two.

That prediction was made here last week by Paul Hessinger, director of advanced technology research at Computer Task Group, Inc. in Buffalo, N.Y. Hessinger told attendees of the Association for Systems Management's annual conference that they can expect machines in future business settings to function as information systems development workstations and people to function as systems architects and applications engineers.

"While automating more of the traditional programming process is feasible with advanced technology," Hessinger said, "human involvement by the programmers themselves is a critical success factor if we are to move in the direction of 'programming machines.'"

Furthermore, "greater programmer productivity may be the wrong focus." A more appropriate focus might be the "careful planning and analysis of the data required for corporate information systems," Hessinger said.

The challenge of the '80s is threefold, according to Hessinger:

- To take advantage of and manage the less expensive technologies.
- To manage people — both users and technicians — more effectively.
- To manage data resources.

A new definition of productivity — one that would replace "lines of code divided by person-hours of work" — might be "net useful output divided by resources employed," Hessinger said.

One of the major stumbling blocks to tomorrow's programming is resistance, according to Hessinger. Users resist fourth-generation software and such systems as voice grocery checkout systems and even telephone answering machines.

Noting that programmers often consider themselves artists and con-

DGC to Offer Seminar On IBM System/38

NEW YORK — "Everything You Always Wanted to Know About the IBM System/38 ... But Didn't Know Who to Ask" is the name of a two-day seminar being offered here by DGC, Inc. May 23-24 and again on June 20-21.

The seminar is aimed at technical personnel and DP managers who either have or are considering buying an IBM System/38, according to DGC. It will be conducted by David Greenblatt, a System/38 consultant and president of DGC. Topics on the agenda are said to include System/38 hardware, data base, programming, developing on-line programs on the System/38, communications, alternatives and other system issues.

The fee for the conference is \$595. Further details are available from DGC, 812 Roosevelt Court, Far Rockaway, N.Y. 11691.

CW at ASM

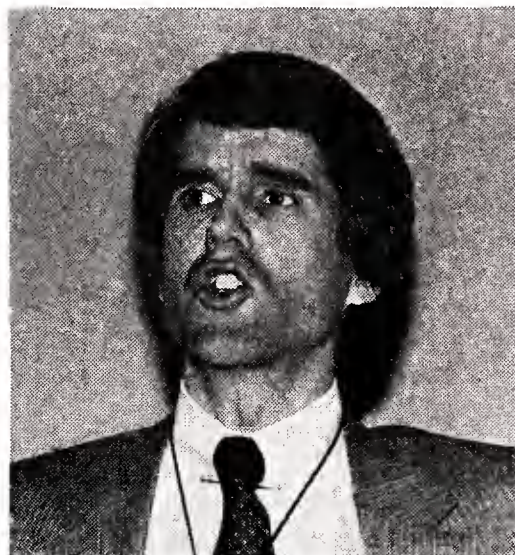
sider programming an art, Hessinger contended that "programming must be seen as a science, not an art, if we are to automate more and more."

Highlighting the lack of programming talent as opposed to a lack of programmers, the speaker advised that fourth-generation software must be accompanied by "a proper reorientation of programming techniques." These techniques must tell the programmer how and in what

environment to use the software.

In building the four major types of information systems — routine processing, information retrieval, decision support and personal computing — fourth-generation environments will call for prototyping and simulation, Hessinger said.

"Simulation gives users feedback in the development process," he noted, "as well as a more direct interchange of ideas, especially in business environments where requirements change fast. It is not good enough anymore to say, 'I'll be back in six months or 18 months with your application,'" Hessinger maintained.



CW Photo by M. Zientara

Paul Hessinger

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CAB Expected to Curtail Providers' Use Of Airline Reservations Systems Payments

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The Civil Aeronautics Board (CAB) is expected to act later this month to curtail a practice whereby travel agents use major airlines' computerized reservations systems to write tickets for competing carriers but give the systems providers temporary use of the ticket payments.

American Airlines and United Airlines provide the systems most commonly used by U.S. travel agents, who can use them to book flights on competing carriers. If the systems providers are designated the ticketing carriers, there is a delay in

getting the payments to the airlines actually used. Competing firms have complained about the adverse effects of the delayed payments, but systems providers argue they do not encourage agents to continue this practice.

Initial CAB staff recommendations on ending this practice, which stem from the agency's ongoing investigation into possible anticompetitive effects of computerized reservations systems, were presented to the board late last month. The staff is now completing its work, and its study should be finalized by the end of this month, a CAB spokesman said.

In a related development, the Justice Department has asked the CAB to refrain from investigating the computer systems. The department's Antitrust Division, which is pursuing a similar investigation, said that the CAB inquiry is unnecessarily duplicative, wasteful of government resources and would impose burdens on the airlines under investigation.

The Justice probe, initiated last year, stemmed from charges by now-bankrupt Braniff International that American Airlines used its system to sabotage Braniff reservations [CW, May 31, 1982]. A grand jury inquiry in Texas, where both American and Braniff are headquartered, has completed its work with the Justice De-

partment deciding not to seek criminal antitrust charges, but the department is continuing its probe with a view toward possible civil action.

Antitrust Division Chief William F. Baxter told CAB Chairman Dan McKinnon in a letter last month that "a very significant aspect of the continuing investigation is possible anticompetitive use by American Airlines of its computer reservations system. In addition, a full-time investigation into possible anticompetitive practices associated with the United Airlines [computer reservations system] has been underway for over a year."

Referring to CAB's inquiry into the same matters, Baxter said that "simultaneous investigation by two government agencies into precisely the same conduct to answer precisely the same questions wastes limited government resources."

"In brief, the government should conduct but one investigation concerning computer reservations systems and their effect on the airline industry," Baxter said. He argued that task should be left to the Justice Department, but the CAB spokesman said "We are under a mandate from Congress to conduct [our own investigation]."

Lack of Computer Security Examined by Symposium

By Robert Batt

CW West Coast Bureau

OAKLAND, Calif. — Lack of user-friendly products, proliferation of networks and the need to change management attitudes were the main focus of a panel session on computer security in private industry at a symposium here last week.

Addressing the 1983 Symposium on Security and Privacy sponsored by the IEEE Computer Society's Technical Committee on Security and Privacy, several speakers lashed out at vendors who provide inadequate products or support services.

"I can think of several companies who do not support their products, and we would prefer not to do business with them," said session moderator Leslie Chalmers of the Bank of California.

"Vendors really need to get their acts together. As users we want products that are reliable and easy to install with no modification. If the thing breaks, we want fast and available support," she said.

A strong attack on products in the field of data security was also launched by Carol Thistlethwaite, manager of corporate information systems at the Bank of America. "There is a lack of products in some areas, or if they exist they have not been well-tuned enough to be safely implemented. For example, what is being offered in the area of microcomputers is pathetic. There are no audit trails or controls," she said.

Thistlethwaite called for the introduction of many more security products for smaller systems, adding that

much more work needs to be done in the area of personal identification.

"In the banking sector, with both employees and customers using terminals, the ability to identify and verify the computer user is going to be paramount. I don't like the fact that the current state of the art in personal identification is the password. This seems to me to be a clumsy way of protecting information," she added.

Ed Wagner, manager of data security at Syntex Corp, a Palo Alto, Calif.-based manufacturer of pharmaceuticals, typified the panel's views by saying that security products need to be mass marketed, easy to install and easy to administer.

Increasing use of networks is another problem in terms of data security, asserted John Brown, staff specialist of data security at Standard Oil Co. of California. "There are no generally agreed-upon principles or pieces of software that allow for security in integrated networks. There are no controls for securing the network once it is in place, and with the portability of data through the use of micros, this is becoming an area of major concern," he told his audience. Turning to the question of management's role, Chalmers said that many commercial companies do not have data security systems because senior executives do not perceive security to be a problem or encryption to be a viable solution. "I know of no company where the person responsible for security has veto power over the implementation of a new system," she stated.

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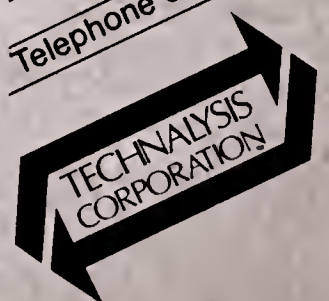
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CW Photo by P. Gillin

Wayne S. Pierce

Pick Package Before System: Speaker

By Paul Gillin
CW Staff

CHICAGO — You will never find a packaged software application that does the job as well as a package you developed yourself. But you can minimize the differences by first choosing the application that fits your needs and only then selecting hardware that provides optimum performance for that package, according to

CW at Future

Wayne S. Pierce, a consultant for Arthur Andersen & Co.

Speaking at the recent conference of Future, the users group for Management Science America, Inc.'s general ledger system, Pierce presented a plan for choosing applications. He warned, however, that users who

commit themselves to a vendor for a major application may have to change their hardware configurations to maintain compatibility with future applications.

Pierce noted that software houses that once offered only a few major applications are now branching out into

sophisticated programming methodologies that can be used to produce a variety of specific applications. But, he added, "Software houses will be aligning themselves more closely with one vendor and providing very powerful tools that maximize that hardware."

He advised users to look at future applications with the thought that they may be locking themselves into one piece of hardware.

Packaged software has major disadvantages, he stated. It is often claimed to have more capabilities than it really has; it rarely fits well with installed software, and it is not as flexible as customized packages. The vendor maintains near-total control over revisions and upgrades, and it often locks the user into a single software vendor.

However, for a major application like general ledger, packages offer a much lower price and guaranteed success, he noted. The trick is in looking for a solution, armed with a clear idea of your requirements. "If you don't know what you need, the vendor will be glad to tell you," he cautioned.

Users have a variety of options, he said. Many hardware manufacturers offer or recommend software that optimizes their system capabilities. OEMs may offer bundled configurations that fit the bill. A third option is software houses, which can save the tremendous resources required to build complex packages.

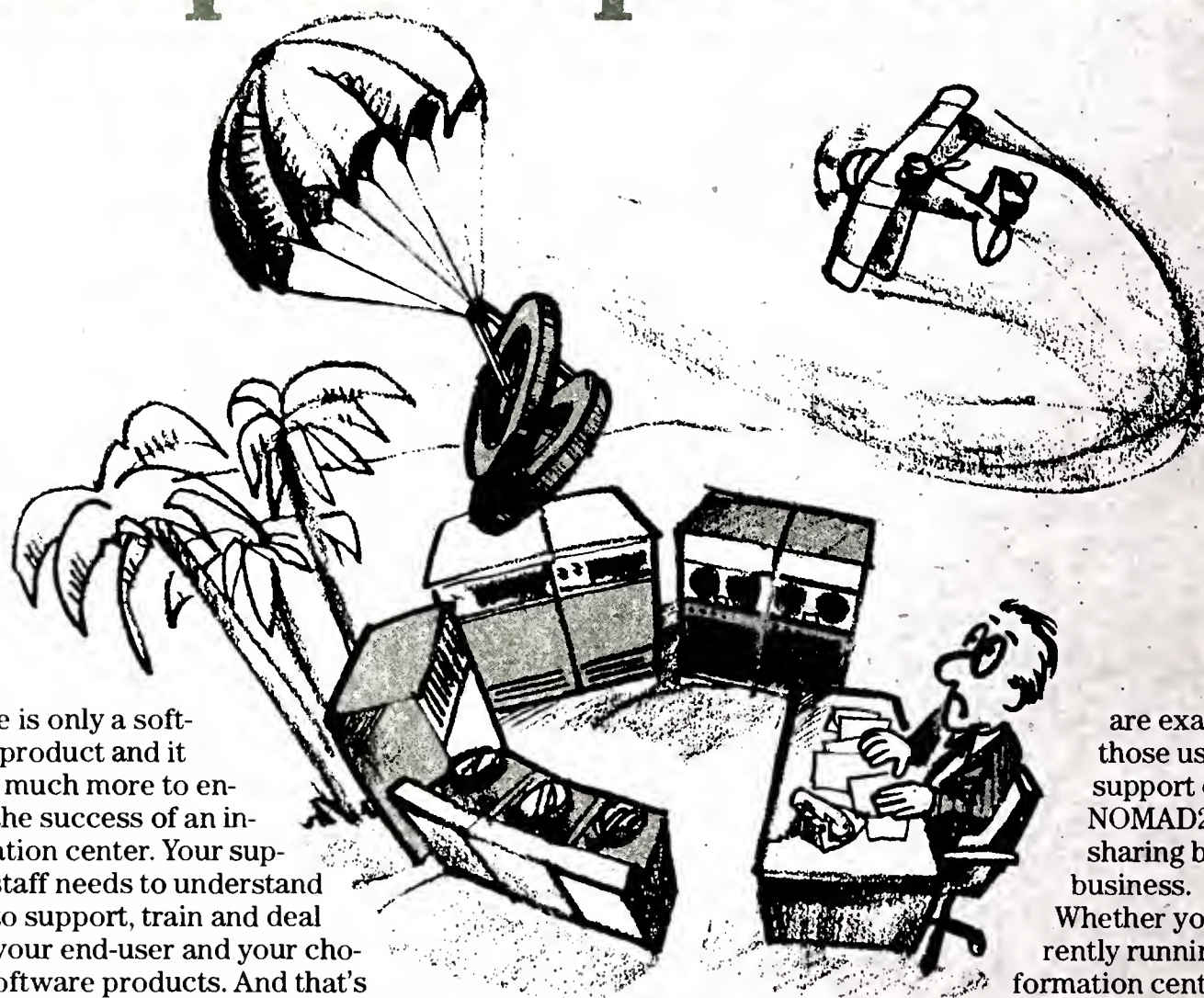
Another possibility is software subsidiaries of big companies, which may offer systems developed in-house at a fraction of their development costs. In electing this route, he warned, be aware that these vendors may offer little or no support. Be sure to get a copy of the source code and thorough documentation.

Other factors to consider include the programming language in which the software is written. "This is especially important if you are purchasing from a software subsidiary," he said.

It is also a good idea to view a demonstration of the software before making a decision, Pierce advised. He noted that users usually reap the biggest cost and benefits by buying applications software late in the year when many companies are scrambling to bring up their bottom lines.

"No company wants to record a loss, so it's interesting how much negotiating power you have on a contract signed in December," he said.

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Zenith Radio Utilizing Micros as 'Tool' To Aid Automation of Reporting Process

By Paul Gillin
CW Staff

CHICAGO — The DP department at Zenith Radio Corp. jumped into the microcomputer arena early and in doing so implemented a project that will save the company millions of dollars this coming year.

"The attitude management information systems takes toward micros varies from adamantly stopping them to actively leading," said Thomas Buchsbaum, Zenith's DP manager. "I've taken the most progressive approach. Micros can fit in as just one more tool that you in DP can use."

Buchsbaum, who began working with micros in 1979, led a session on "Microcomputers in Distributed Management Information Systems" at the conference of Future, the user group for Management Science America, Inc.'s (MSA) general ledger package.

With the company suffering during the recent recession, Buchsbaum in 1981 began looking for micro applications in an area in which Zenith had been frustrated by long turn-around times and voluminous paperwork. Communications between Zenith headquarters and its 80 North American distributors had traditionally been handled through telex, TWX and telegrams at a cost of about \$3 for a one-page message, he said.

In addition, every distributor was required weekly to fill out a 14-page sales and inventory report detailing the activity for the preceding week. Because a manual method was used, the reports often took two weeks to get from the distributor's desk to the mainframe computer in Chicago. Illegibility and errors were also a problem, Buchsbaum said.

Buchsbaum saw that Zenith could save big money by automating this reporting procedure and providing a communications network for that and other messages. The resulting idea was Zgram, a project that has cut telecommunications costs by 90% and is spreading rapidly throughout the company, he said.

Zgram uses a network of microcomputers at distributors throughout North America for filling out reports and creating messages and includes electronic mail facilities for communications between users and to the company mainframe.

The DP department investigated a variety of direct communications alternatives but found the most cost-effective was Telenet, a value-added electronic mail service provided by GTE Telenet Corp. Telenet provides an electronic mailbox and a \$4/hour overnight charge, he said.

The microcomputer hardware is a Zenith 8-bit desktop computer, "But any [Digital Research, Inc. CP/M] or [Microsoft, Inc. MS-DOS] operating system would work," he said. The only other hardware used is an inexpensive high-speed dot matrix printer and a [Hayes Microcomputer Products, Inc.] Smartmodem, which has a self-dialing feature. Text management software is [Peachtree, Inc.'s] Peachtext, which Buchsbaum said offered the user-friendly features the network required.

CW at Future

Zenith's DP staff wrote the communications software, which Buchsbaum said was "not very difficult compared to something like writing for [IBM's] CICS." Zenith uses Telenet's central mailbox in Vienna, Va., and dial-up lines that can be accessed from 250 cities by a local telephone call.

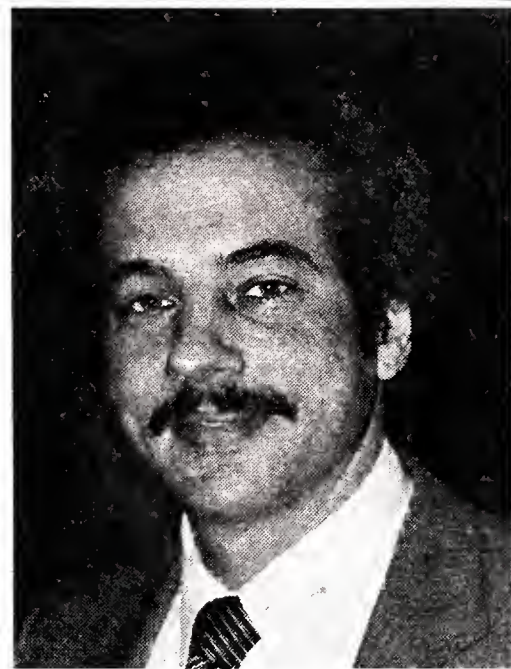
Most system activity occurs at night, when rates are lowest. Distributors can create messages and "enve-

lopes" detailing the recipients and describing the contents of each message. A procedure written for the system tallies all mail and daily transactions and prepares them for nightly transmission.

At 9 p.m. every night, the user's modem dials up the Vienna mailbox center and transmits all the day's data and messages. Then, in the early morning, the modem calls Vienna again to receive messages addressed to the distributor.

At the start of each day, the user turns on the system and receives a printout of the previous day's messages. The system includes a feature

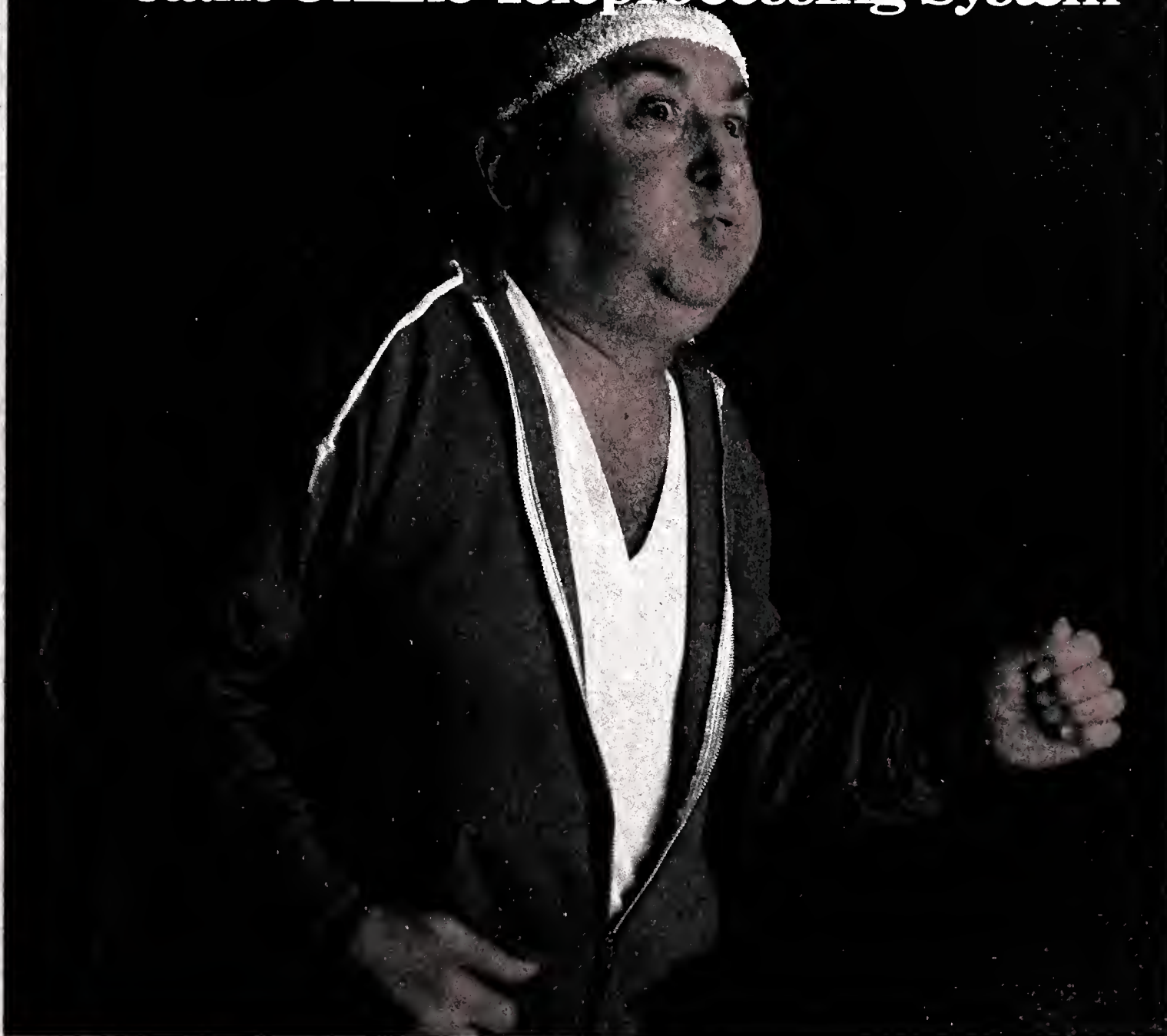
(Continued on Page 22)



CW Photo by P. Gillin

"Micros can fit in as just one more tool that you in DP can use," said Thomas Buchsbaum, Zenith's DP manager.

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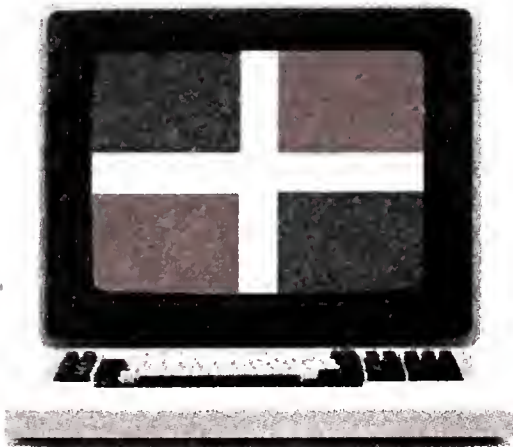
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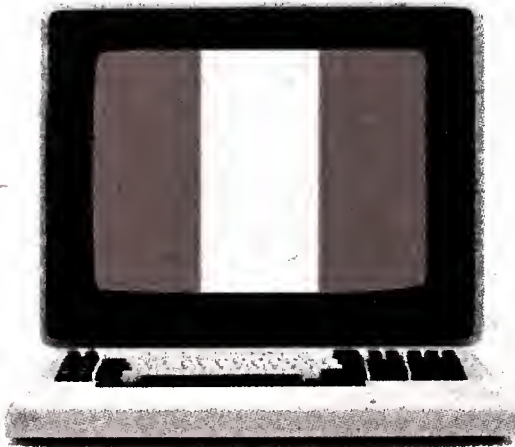
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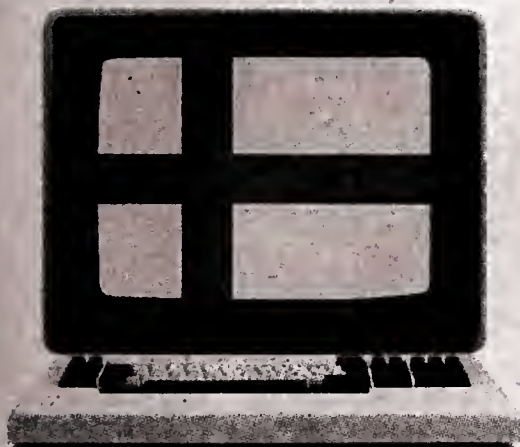


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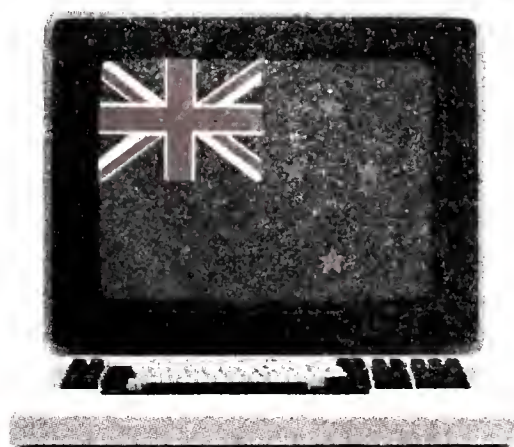
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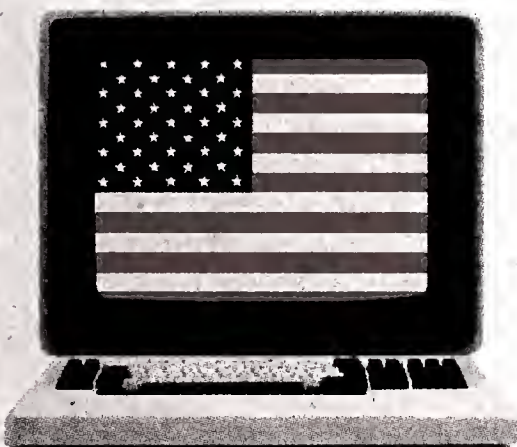
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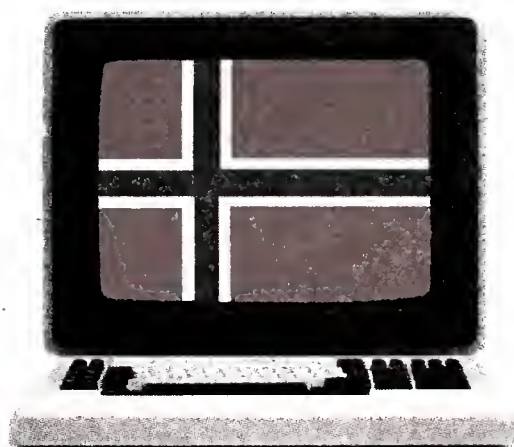
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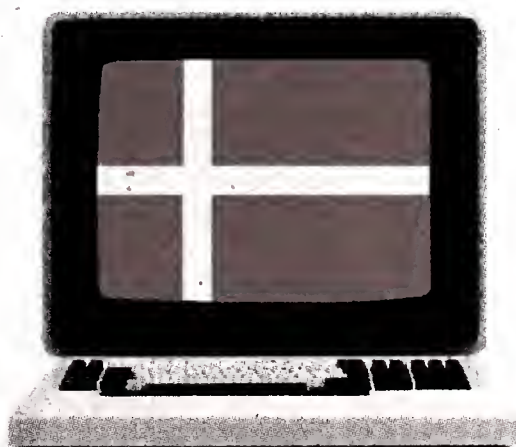
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Ways to Integrate Software Tools Suggested

CHICAGO — Packaged applications software, nonprocedural languages, fourth-generation methodologies and structured programming can be integrated to create an information systems environment that is more effective than those four productivity measures used separately, according to a DP consultant.

Speaking at the recent meeting of Future, the user group for Management Science America, Inc.'s general ledger package (story on Page 23), consultant Michael B. Ruggera offered some guidelines for incrementally bringing advanced methodologies into a DP environment without disrupting operations.

First, Ruggera noted, try to buy packaged software whenever possi-

CW at Future

ble. If an application needs to be grown in-house, do it using structured methodologies and fourth-generation languages.

For existing file structures, Ruggera advocates taking a relational approach to file management. That allows any data file to be viewed as a table of rows and columns. Columns can be isolated and rows selected using any criteria, he said. Tables can be logically matched with each other using a column in each table that contains the same data element. For

any two tables that do not logically match, a third table can be created to define how to relate the other two tables, he said.

"Data in DP has always been inherently relational, but it took too much Cobol code to write the joining programs," he said. "With fourth-generation languages you can do that in a few hours."

A second file management concept called the Third Normal Form involves removing repeating groups into separate segments of the file and separating descriptors into separate files or eliminating them entirely. A change to one table changes that value on all tables. Automatic calculations are not performed unless requested.

As the need arises, build file definitions into existing files using a fourth-generation language and create a table of file definitions into an on-line file or as partitioned data set members, Ruggera recommended. "Don't bother doing this on all the files because you're going to end up writing definitions you'll never need," he said. "Do it as you go along."

Train users in fourth-generation languages and allow them to access the data base freely, but not to write file definitions, he said.

Micros Called Another 'Tool'

(Continued from Page 19)

that allows for immediate delivery of urgent messages, Buchsbaum said.

The DP department built other capabilities into Zgram to ensure data integrity and security, the DP manager added. A data verification procedure performs echo checks on every character and a checksum on every line. Recovery and restart features are built in to allow the system to recover from noncritical shutdowns overnight.

Error monitoring procedures check line integrity through echo checks and redials the call if the connection is below par. An error checking feature notifies the user if a message could not be read and identifies the sender. Message acknowledgment ensures that each message is fully read.

Zgram also incorporates extensive data encryption features, Buchsbaum said.

Zgram has been so successful that the network now embodies 240 nodes, with more being added, "at the rate of three or four per week," Buchsbaum said. The system is now used for order, inventory, statements, sales statistics, credit checks, receivables information and service requirements.

Messaging costs average about 20 cents per page, Buchsbaum said, and that cost will be cut in half when a new project is completed to tie the mainframe directly into Telenet for constant on-line transmission. "And, much as I hate to say it, our invoice system, when implemented, will save the cost of six full-time data entry people," he said.

Buchsbaum's main piece of advice for DP managers: "Your group should take a progressive and active approach with microcomputing." He stated that when Zgram began at Zenith, there was one manager overseeing the project on a part-time basis. That manager's department has now grown to seven people, "and it has more than paid for itself," he said.

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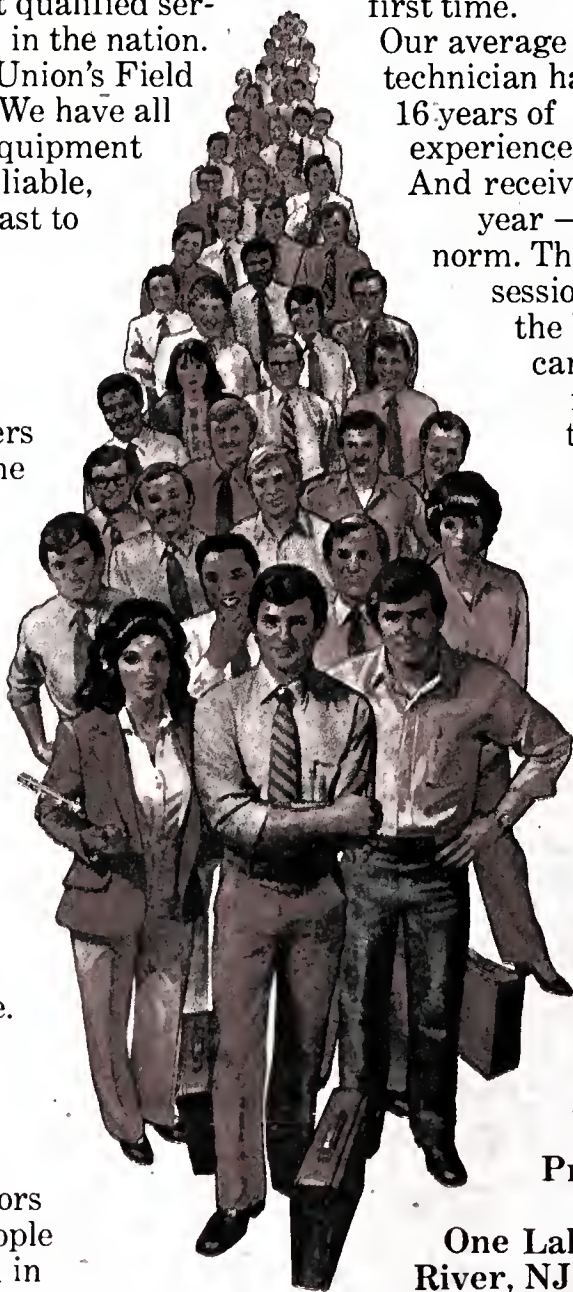
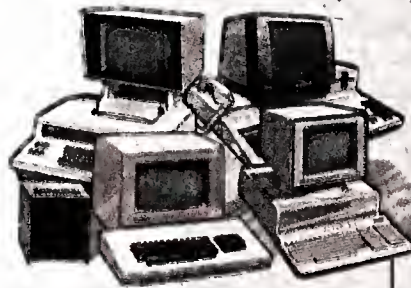
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Improved Programming Technologies Examined

By Paul Gillin
CW Staff

CHICAGO — For the first time, DP managers are being asked to provide an environment that is both productive and user-friendly. Such harmony is possible using a variety of productivity measures, but no one method is the answer.

Speaking at a recent conference sponsored by Future, the users group of Management Science America, Inc.'s general ledger package, independent consultant Michael Ruggera said the two functions that DP supports have very different characteristics.

A production system is marked by long lead times, familiarity to DP, a high degree of structure and low visibility to upper management. Ad hoc queries, on the other hand, require a short lead time and flexibility of data. They are highly visible to upper management.

Ruggera outlined pros and cons of four technologies that offer improved programming efficiency and suggested a way to integrate them into a synergistic environment (story on Page 22).

Packaged software offers the advantage of low cost; expenses run about one-seventh that of developing in-house, he said. It practically eliminates development time and involves little risk if purchased from a reputable vendor.

It is well documented and receives

regular updates, both in the form of improvements and responses to regulatory changes.

Its major disadvantage is a rigidity that may force a change in company style, he noted. Packaged software also usually does not do everything you want it to do. The user is beholden to the vendor to modify at the vendor's discretion or face loss of support.

In addition, packaged software often does not integrate well with other packages, Ruggera pointed out.

DBMS 'Dilemma'

Ruggera called data base management systems (DBMS) "a really good idea" that still contains some fundamental problems. Separating data from programs is an ideal way to avoid repetitive programming, he said.

It also allows you to integrate data from divergent systems. A DBMS offers improved facilities to manage data and can handle high volumes at high speeds.

The problem with DBMS is that it can never be implemented across the entire program structure without tremendous cost, he said. A project of that kind would take about seven years to complete at a large shop, by which time requirements would have changed. There is a high risk factor built into such a conversion, and the project is unlikely to succeed, anyway.

CW at Future

He noted that there have been encouraging signs of late as DBMS vendors have begun marketing their own applications.

Nonprocedural languages offer the advantage of ease of use, with the time needed to learn them cut to about one-quarter that of procedural languages, he said. These languages, too, provide separation of data from the programs and offer access across a wide range of formats and file structures.

Their major disadvantages include inefficiency in high volumes. One of Ruggera's clients took 13 hours to load 100,000 files, he said. They are prone to abuse by inexperienced users who think they can efficiently structure programs, and they are too often sold as total solutions by vendors.

Turning to structured systems development methodologies, Ruggera characterized them as promising because they involve the user at each stage of the development cycle. They provide good supporting documentation and are "reasonably maintainable," he said.

Because they offer greater managerial control over the project cycle, the final product is usually of a high-

er quality, with less of a need for revisions.

Structured methodologies are hampered by their high costs, both in the time needed to program "basically from scratch" and the high involvement by the end user.

Experienced people are needed to develop and maintain the programs, Ruggera noted. And there is still a need to redevelop the programs after five to seven years because the software wears out, the consultant maintained.



CW Photo by P. Gillin

The two functions supported by the DP department have very different characteristics, consultant Michael Ruggera pointed out.



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SSA Upgrade Reported Ahead of Schedule

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. —

Lost amidst the recent furor over the Social Security Administration's (SSA) acquisition of Paradyne Corp. terminals has been the fact that the questionable contract is just a small part of the agency's \$500 million systems upgrade, a process one SSA official said is going smoothly and ahead of schedule.

Although the five-year modernization program, announced in March 1982, has a long way to go, the agency has made "significant progress" in some areas, according to Marshall Mandell, deputy SSA commissioner for systems.

Mandell did not minimize the problems of the past or the obstacles to upgrading capabilities while maintaining the SSA system's operations, which include issuance of 36 million benefits checks every month. The agency must overcome some 12 million to 13 million lines of mostly undocumented software and replace what Mandell called SSA's IBM 370/168 "dinosaurs" and convert to disk most of its 600,000 reels of tape.

In the tape-to-disk conversion process, Mandell said, the agency has already purchased 282G bytes of an eventual 600G bytes of IBM 3380 disk storage.

SSA hopes to be ready by the end of this year to begin replacing its mainframes with new machines that will increase agency computer capacity by 400% and lead to the eventual reduction of the current 50,000 to 70,000

hours of backlog.

Reagan, Congress At Loggerheads

WASHINGTON, D.C. — The Reagan administration will continue to oppose congressional proposals to create a new government organization devoted to international communications and information, a State Department official said recently.

Kenneth Leeson, who was recently named special adviser to Diana Lady Dougan, the designee for the newly created State position of coordinator for International Communication and Information Policy, said Dougan's appointment, carrying the rank of ambassador, should end "the petty turf battles" that for several years have marked U.S. efforts to develop and implement policies in this area.

Interested members of Congress are not satisfied with this State Department reorganization, however, and have introduced bills to create White House entities to perform the policy development and coordinating duties. The Senate measure, S. 999, calls for a "special representative for telecommunications and information" [CW, April 18]; a House bill, H.R. 2527, would create a special committee for this function, chaired by the U.S. Trade representative.

Leeson said the new State Department office, although "just getting off the ground,"

has already received "a good deal of cooperation" from the various government agencies and offices now responsible for these international issues. The new organization should be sufficient for making "the appropriate information available to the policymakers," he said.

Leeson was formerly with the National Telecommunications and Information Administration (NTIA), where he oversaw development of a lengthy report to Congress that criticized U.S. government response to international information and telecommunications issues [CW, March 14]. Now at the State Department, Leeson said the report was "the basis for a great deal of discussion and debate" within the government, but that it was strictly an NTIA report and will not necessarily serve as Dougan's model for policy development.

Dougan's duties will include overall coordinating responsibility within the federal government for policy formulation and oversight, working with Congress, serving as principal liaison with the private sector and representing the U.S. to foreign governments and organizations. Previously, Dougan was a director of the Corporation for Public Broadcasting and a marketing and telecommunications specialist with Dougan & Associates, Salt Lake City, Utah.

FTC Head Warns Of Protectionism

WASHINGTON, D.C. — Federal Trade Commissioner James C. Miller III last week warned against adopting an industrial policy based on government promotion of high technology and protectionist actions to preserve aging industries.

Issuing his call for free market competition in a speech in Detroit, the heartland of ailing smokestack America, Miller decried what he called "Atari mercantilism," which he said is based on the "simplistic notion that economic salvation lies in governmental intervention to promote high technology on the one hand and to erect barriers to competition in basic industries on the other."

According to Miller, many of this country's current economic ills can be traced to past government intervention. He also sought to shatter the myth that Japanese economic success is based on that country's government

actions, which some are saying should be countered by Washington.

Productivity Meet Set for September

WASHINGTON, D.C. — The White House has set Sept. 22-23 as the date for a national conference on productivity, a gathering of business, labor, academia and government mandated in a law passed by Congress.

The law sets 11 policy areas for consideration, including promoting technological benefits for productivity improvement, increasing the general training and skill level of the American work force, revising tax laws to promote productivity and reviewing patent laws and antitrust policies and statutes.

A series of four preparatory conferences will be held this summer at locations around the country. Six committees have been established to develop recommendations in specific areas.

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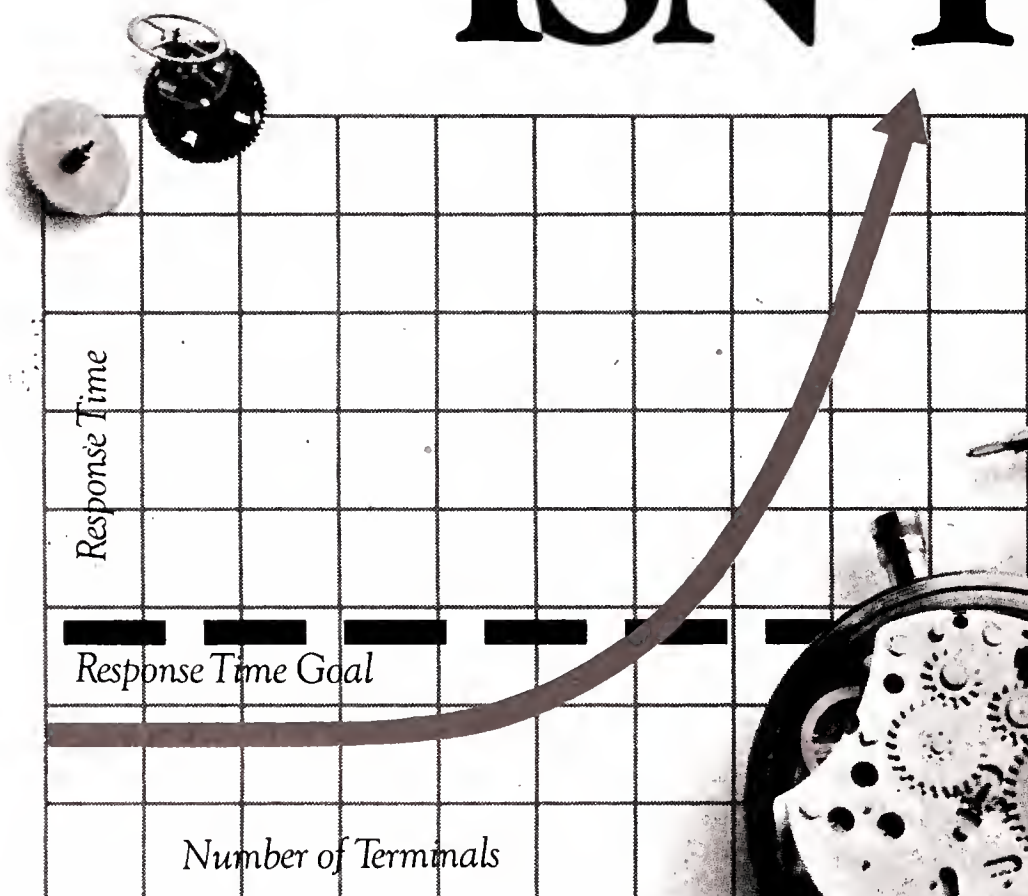
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Researchers Speculate on Changing Face of DP

By Tom Henkel
CW Staff

The demise of the DP center and a new definition of "user-friendly systems" are some predictions about tomorrow's technology put forth by researchers today.

The contention that in the not-so-distant future the DP department as we know it will cease to exist came during recent interviews with Walt Doherty of IBM's Thomas J. Watson Research Center and Don Simon from PA International Management Consultants, Inc.

The researchers agreed that with computer training becoming commonplace in most school systems, the user-friendly systems of the future may be considered highly technical by today's standards.

Users, while more dependent on their computer systems, will also have more control over them, according to Doherty, manager of productivity and technology transfer at the Computing Systems Department of IBM's research center in Yorktown Heights, N.Y.

Much-talked-about technologies like cryogenics, bioelectronics and advances in silicon and gallium arsenide chip designs will most likely offer a boost in system response time and allow each user to have more computing power at his fingertips. That will have "a profound effect on the user," Doherty said, allowing the system to do more of the tedious work and making it easier for each user to tap the wealth of information stored in corporate data bases.

Extinction of Programmers?

Programmers may also become a thing of the past. Noting that studies at IBM and Exxon Corp. have revealed that approximately 2% of programs written have a global impact on large organizations, Doherty said the increasing technical knowledge of users coupled with easier-to-use systems will eventually eliminate the need for a DP department stocked with programmers who write code for other people to use.

Noting that the centralized programmer pool never really worked in dealing with users' needs, Doherty said in the future most users will develop their own programs.

In fact, at IBM's research center, less than 5% of the employees have the job classification of "programmer," Doherty said, comparing current trends in data processing to the changes that happened in the auto industry 50 years ago when widespread use of chauffeurs was replaced by drivers controlling their own cars.

But the programmer may never really vanish from the DP picture. People currently classified as programmers may just wind up being

called data base managers or developers of interface tools to help users gain access to more data bases, Doherty said.

The entire structure of corporations may also change as more and more employees become computer users. Instead of having one boss, a typical worker may report to many managers and share information with virtually everyone in the company.

Despite more technologically advanced computer systems with more data bases, the easiest and fastest way to get appropriate information is still going to be to ask a human, according to Doherty. Where advanced computer systems will prove a big asset is in giving users almost immedi-

ate access to the person who knows the answers, he said.

Simon, principal researcher at PA International Management Consultants, a Princeton, N.J.-based technology research firm, predicted that the increasing sophistication of system designs may have its biggest impact in the manufacturing area.

As DP functions become more closely tied with manufacturing and materials handling, Simon said, managers may have instant control over the managing process. In fact, if researchers are able to make strides in device miniaturization, it may be possible to develop chip-level machines that can replace whole factories, he offered.

One of the most fertile industries

for integrating data processing and manufacturing is publishing. Within 10 years, today's publishing industry will be dead, he maintained, since book vendors will be able to store nonprinted information instead of an inventory of books.

By using an integrated computer system and printing unit, a book vendor could call and print virtually anything ever written while offering the buyer a choice of typefaces, binding and publication size.

But while the technology of tomorrow may make lives easier, both researchers warned that the process will take time. It is impossible to whip new technologies into full-fledged systems overnight, Doherty concluded.

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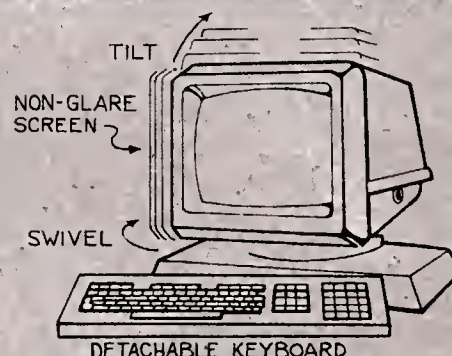
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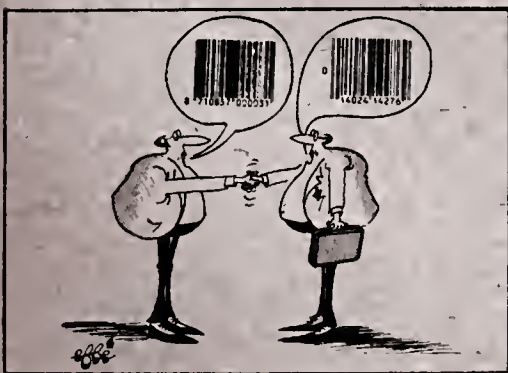
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Justice Wants FCC to Force BOCs To Form Marketing Subsidiaries

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. —

Bell operating companies that want to market terminal equipment and computer-based, on-line services should be required to do so through separate subsidiaries, the Department of Justice told the Federal Communications Commission late

last month.

The department's comments were among those submitted in response to a commission inquiry concerning possible modification of the Second Computer Inquiry Decision.

At present, Computer II states that if AT&T or any of its operating companies wants to market terminal

equipment or enhanced services, it must be done through one or more separate subsidiaries.

Separate Subsidiaries

But since the decision was adopted before settlement of the government's antitrust case against AT&T, Computer II does not address whether the 22 Bell operating companies to be divested early next year as a result of that settlement must form separate subsidiaries.

Telecommunications users, as well as prospective competitors of the divested Bell operating companies will be impacted by the commission's ultimate answer to this question, the Justice Department indicated in its recent comment.

The divested Bell operating companies will have the same capability to discriminate against competitors and to cross-subsidize competitive services with revenue earned from monopoly offerings that AT&T has had for years, the Justice Department argued.

'Substantial Dangers'

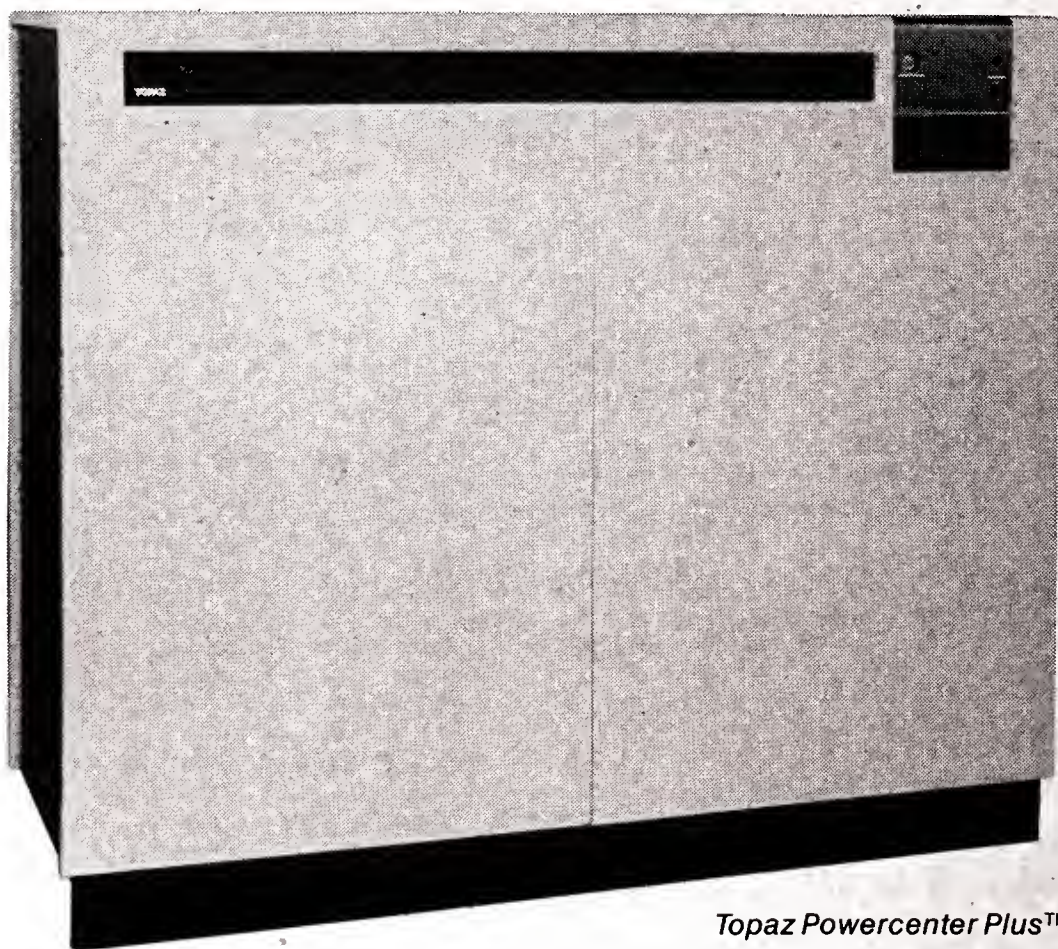
It added that "the provision by [Bell operating companies] of ... business systems ... can pose substantial competitive dangers" because such systems "require a high degree of coordination between the equipment provider and the local exchange carrier regarding complex installation, maintenance testing and restoration."

"A [Bell operating company] selling its own products ... would have a strong incentive to coordinate less efficiently with unaffiliated [terminal] providers. The relative advantage thus obtained would result in profits gained through abuse of control of the local telephone network bottleneck," the department stated.

In contrast, the Computer and Business Equipment Manufacturers Association (Cbema) argued that the AT&T-Justice Department antitrust settlement "appears to bar the divested [Bell operating companies] from providing any enhanced services."

The association added that "even if the Bell operating companies were not so generally barred, the need for separate subsidiaries or any other pro-competitive safeguards could best be addressed only when the Bell operating companies ... identify and disclose such services as they believe to be permitted by the [settlement agreement]."

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Access Charge Hike Draws Greene's Fire

By Phil Hirsch

CW Washington Bureau
WASHINGTON, D.C. — Federal District Court Judge Harold Greene sharply criticized the Federal Communications Commission (FCC) late last month for imposing higher rates on telephone network users.

The new rates are likely to become effective next January, when 22 Bell operating companies are scheduled to be divested by AT&T. Break-up of the Bell system is a key provision of the antitrust settlement agreement the telephone company negotiated with the Department of Justice last year.

Greene, who presided at the U.S. vs. AT&T trial and is now overseeing implementation of the settlement agreement, directed his criticism at an FCC decision issued in March [CW, March 7] which reallocated the costs of providing local access to long-distance circuits. Historically, long-distance communications carriers have paid these charges and have been reimbursed by their customers. Under the new scheme, part of the long-distance access charge will be billed directly to the customer. A flat charge will be levied on all users, including those who do not make long-distance calls.

The result will be an increase of at least \$2/mo per line for residential service and at least \$4/mo per line for business service. The increase may be greater, since part of the local access charge will be based on usage.

The access charge decision "runs directly counter" to one of the Modified Final Judgment's "principal assumptions and purposes — that the fostering of competition in the telecommunications field need not and should not be the cause of an increase in local telephone rates," Greene said. He added that "the FCC action appears to be an unjustifiable

effort to assign to the divestiture responsibility for a reallocation of charges which the commission has decided upon for its own reasons."

Greene also pointed out that before last August, "no one — including the FCC — suggested that access charges should be shifted from the interexchange carriers ... to local users."

Greene Gives Conditional Nod to Lata Plan

WASHINGTON, D.C. — Federal District Court Judge Harold Greene's criticism of the Federal Communications Commission (story at left) came in the course of approving, with some changes, the proposed territories that each of the 22 Bell operating companies will serve after they are divested. The size and location of these Local Access and Transport Areas (Lata) will determine how much of the facilities comprising the present AT&T network will go to the operating companies.

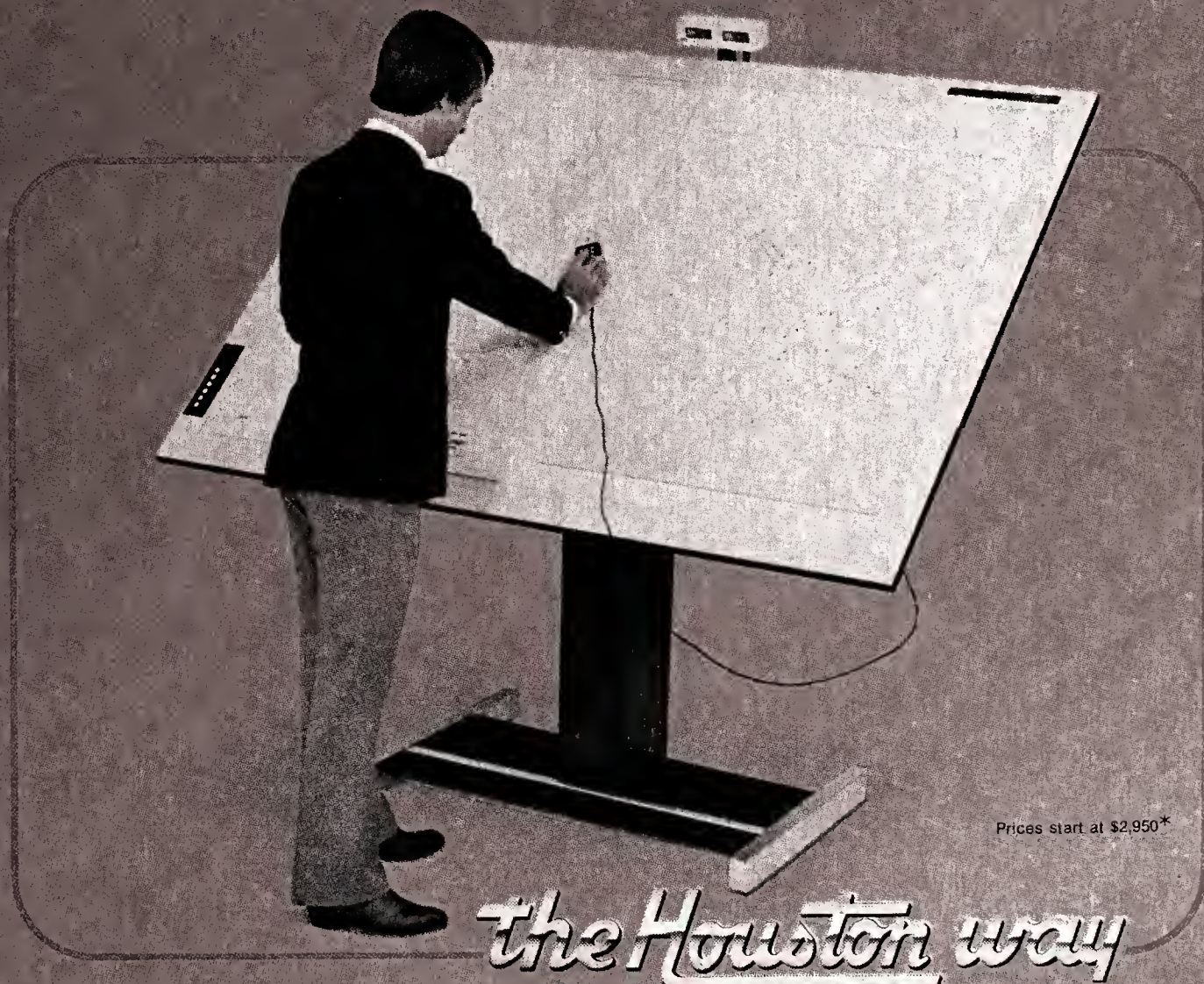
The proposal upon which Greene acted last month was developed late last year by

AT&T and the operating companies. It has been accepted with minor changes by the Department of Justice.

Addressing a complaint by AT&T competitors that the Latas are so large they will give the Bell operating companies a monopoly over short- to medium-haul long-distance communications, Greene is requiring each Bell operating company to promise in writing that it will provide equal access to all interexchange carriers. His acceptance of the proposed boundaries is contingent on receipt of these written promises.

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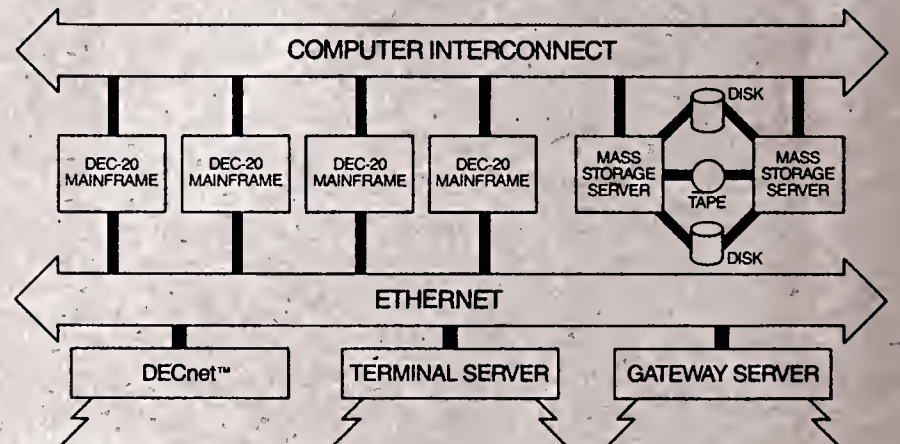
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IBM Users Found

By Tom Henkel
CW Staff

FRAMINGHAM, Mass. — Users of IBM and compatible computers are continuing to migrate to larger systems, but they are doing so at a slower rate than just two years ago.

According to an International Data Corp. (IDC) survey of 923 users of IBM 360, 370, 4300, 30 series and compatible systems, an average of 22% had plans to migrate to a larger machine. That compares with 28% in 1981, according to IDC, which has been conducting the biennial survey since 1972.

The largest percentage of users with migration plans were those with older 360 and 370 series processors. Thirty-nine percent of that

group said they had plans to upgrade. But that percentage is 13.3% less than the 53% who had migration plans in 1981, IDC said.

As has been the case since 1979, virtually no one is migrating to IBM 360 series processors. However, for the first time, IDC said, none of the 370 users polled plan to replace their systems with larger 370 processors. Users with low-end 370 series processors are jumping over high-end 370 and 30 series processors and migrating to processors still considered viable in IBM's lineup, such as the 4341 or 3080 series mainframes.

Conversely, IDC said, users of high-end 370 processors are more likely to migrate to the 3033 line than to the newer 3083. IDC said 35.7% of high-end 370 users with migration plans said they would switch to a 3033 series processor, while only 21.4% have their eye on a 3083.

The IBM 360 and 370 "will continue to be retired in an aggressive fashion. The maintenance costs on these older machines just do not justify keeping the machine running. As would be expected, the only people holding on to 360 machines in 1983 are users who have purchased their CPUs," IDC said.

Moreover, according to IDC, 360 and 370 users are sticking with IBM. Of the 94 users who said they plan to migrate to a larger processor during 1982, only one is switching to an IBM-compatible processor.

The survey also found:

- The most stable group of IBM and compatible users are users of the 30 series. In 1981, 17% of 3033 users

System/38 Drawing Users

FRAMINGHAM, Mass. — Despite "considerable software costs" and a generally painful conversion, a majority of the 137 users of IBM small business systems polled recently said they plan to upgrade to a System/38.

Furthermore, users who have already made the move to a System/38 appear to be happy with their decision, based on a recent survey conducted by International Data Corp. (IDC) here. While only four of the 72 System/38 users polled said they planned an upgrade in 1983, all four said they were buying a larger System/38, IDC said.

Of 60 System/34 users polled, 10% said they planned to upgrade during 1983. Of users planning an upgrade, 83% said they wanted a System/38. Likewise, of 93 System/3 users polled, 26.9% were planning an upgrade, with 48% of those planning for a System/38. IDC said 28% of System/3 users polled said they would buy a System/34.

IDC theorized the data base management capabilities inherent to the object-oriented architecture of the System/38 was the big lure for System/34 and System/3 users. The research firm also noted that the other logical upgrade for users of IBM small business systems — IBM's 4300 line — does not offer the strong data base management capabilities provided by the System/38.

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Migrating to Larger Systems at Slower Rate

had plans to migrate, compared with 16% in the latest survey.

Noting that very few 30 series users are planning a migration (22 out of 137 users polled), IDC said most migrations are occurring among older 3031 and 3032 systems, which do not easily convert to 3033 processors.

The logical migration path for 30 series users is IBM's newer 3080 series.

IDC noted that 45.4% of 3031 users planned to upgrade to the 3083. IDC theorized that virtually all 30 series users would migrate to a 3080 series or compatible processor when they run out of processing power on their current systems.

• IBM's 4300 line, composed of 10 processors in a relatively small performance range, has become a hot-

bed of activity among users. IDC said 23.3% of 4331 users have plans to migrate. Most — 71% — are switching to the larger 4341; 26% are migrating to a larger 4331 processor. Most 4341 users, however, are migrating to larger 4341 processors.

• Users with plans to migrate to larger processors want more main memory than they did in 1981. On the average, users want 11% more main memory, with the biggest demand coming from users of larger IBM mainframes.

• Asked how they planned to pay for their new systems, users were split between outright purchases and leasing their systems. IBM's policy of pushing users to purchase rather than lease systems has apparently

worked for the newer 3080 series models; 53.9% of those polled are planning to purchase 3083 processors and 63.6% are planning 3081 purchases.

However, users of the older 4300 line are not as willing to buy; 42.2% of those polled planned to buy their 4321 or 4331 while 40.3% of 4341 users plan purchases.

Of users planning to lease processors, IDC said more users are turning to the IBM Credit Corp. than to third-party lessors.

IDC's "IBM Migration Study" costs \$3,500 and is offered as part of the firm's Continuous Information Services series of publications. IDC is located at Five Speen Street, Framingham, Mass. 01701.

DOS/VSE Still No. 1 With Users

FRAMINGHAM, Mass. — IBM's DOS/VSE operating system is still No. 1 among IBM users. But VM/370 has acquired a large following in the past two years and is beginning to replace some DOS/VSE and MVS operating environments.

According to a survey of 923 users of IBM and compatible systems conducted by International Data Corp. (IDC) here, the number of DOS/VSE users has increased eightfold since 1979, the first time DOS/VSE was included in IDC's biennial "IBM Migration Study." Currently, about 40% of IBM's large-system installed base uses this operating system.

Although designed principally for the 4300 line, DOS/VS and DOS/VSE have become the most popular operating systems among 370 users, more than 46% of whom run one of the two operating systems, IDC reported. The reason, it theorized, is that low-end 370 users planning to upgrade to the 4300 line make their operating system conversion before their processor swap.

However, since IDC's 1981 migration study, more IBM users are finding the VM/370 operating system an alternative to DOS/VSE, resulting in a 5% dip in DOS/VSE users. "Users looking for an interactive and user-friendly operating system have usually favored VM over any of the other operating systems IBM has to offer," IDC said, noting that over the past two years more 3033 and high-end 370 users have turned to VM/370.

Larger Systems

Among users of larger IBM systems, MVS is still the favorite. Fifty-four percent of 3031 users said they run MVS, as did 67% of 3032 users and 75% of 3033 users. But the percentage of 30 series users running MVS dipped 5% since 1981. When compared with the 5% rise in sites using VM/370, IDC concluded that more high-end IBM users are running MVS under VM/370.

OS/VS1 is the second most popular operating system for larger IBM processors. But "the shift away from this software is overwhelmingly apparent this year," according to IDC.

By the end of 1983, most users replacing 3033 processors or moving up to 3081 processors plan to operate in an MVS/SP environment. However, 40% of 3033 users upgrading within the 3033 line said they plan to operate in a VM/370 mode. Likewise, 28% of new 3081 users said they plan to use VM/370, according to the IDC report.

Thirty-four percent of those planning to migrate to a 3083 processor told IDC they will run VM/370 with one guest operating system; 13% said

they would operate VM/370 with two guest operating systems; and 53% said they plan to operate under VM/CMS. IDC added that half the 4341 users polled said their new systems will use VM/370.

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EDITORIAL

Let the IRS Know

Rarely has the DP/electronics industry shown such a united front as it did recently when representatives of several major vendor associations banded together against an Internal Revenue Service proposal to limit newly enacted tax credits for increasing software research and development [CW, April 25].

The IRS, in drafting regulations to implement the relevant section of the 1981 Economic Recovery Tax Act, proposed to allow the new 25% tax credit only for software R&D in which the activity is directed at completely new products, which, furthermore, must carry substantial risk of failure. This could cost vendors millions of dollars in tax credits for which they fully expected to qualify. Reportedly, many companies have already hiked their R&D expenditures in anticipation of the tax credit.

The effect of the IRS proposal on the vendor community is clear, and many firms, through their spokesmen, have mounted a concerted effort to temper the government's plan. The DP user community fears a similar adverse outcome from this proposal. *Computerworld* has heard from a number of DP shops that were expecting their software development efforts to qualify for the tax break [CW, Feb. 21]. They, too, are upset by the IRS regulation; they, too, are hoping for eventual amelioration of the government proposal. But their voice, unlike that of the vendor community, is lost in the hinterlands and is not heard in Washington.

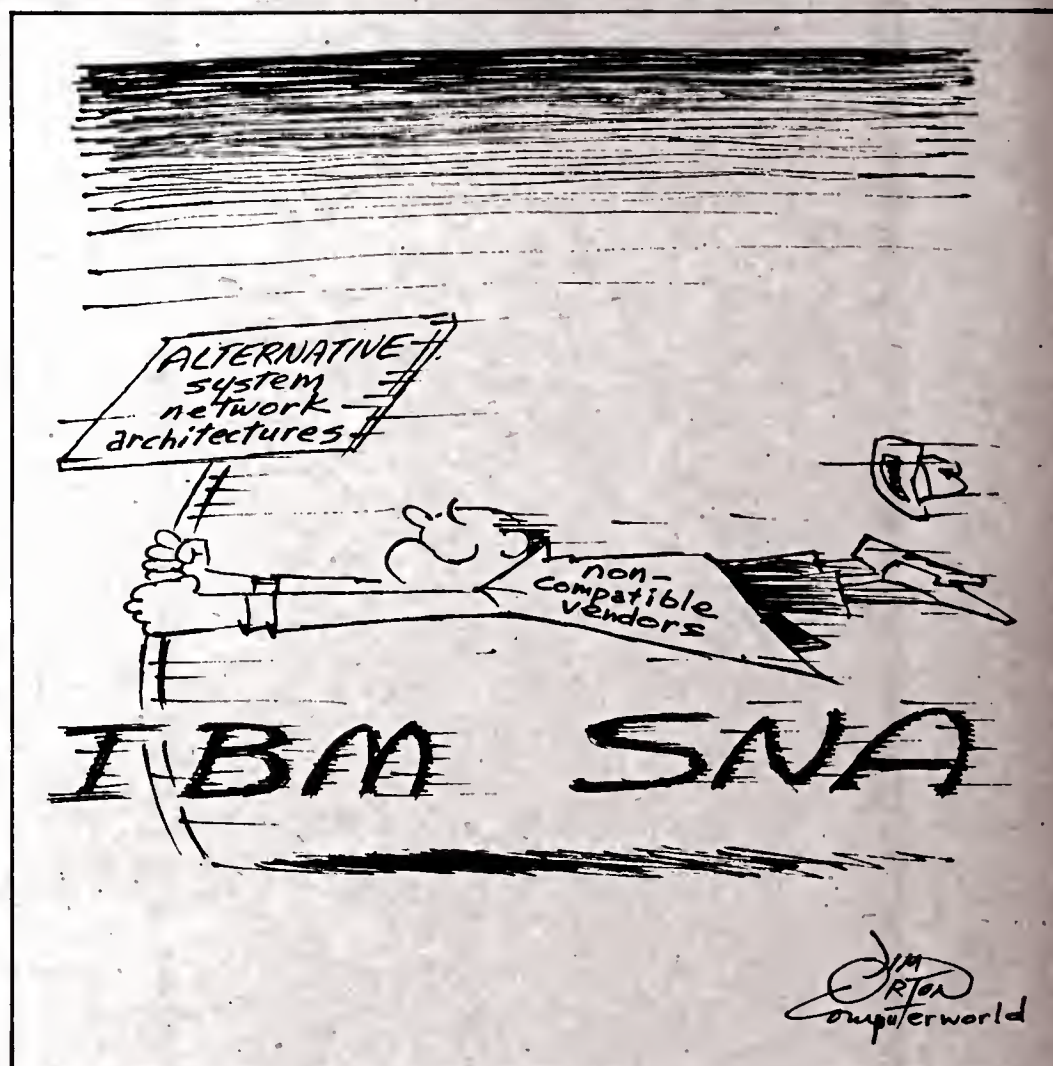
IRS officials have made it clear they do not want to cheat the DP industry of deserved tax credits. The regulation, they say, is merely an attempt to target the credit as they perceive Congress intended. The process is not infallible, they admit, and they further suggest that the eventual, final regulation might be suitably amended.

But can users count on that? There is a certain — and at times healthy — skepticism in the bureaucracy that would lead it to believe large corporations will mount a massive campaign to fight any proposal, no matter how insignificant, that they find bothersome and that it is merely part of the lobbying game played every day in Washington. This line of thought might very well lead the IRS to conclude that large DP vendors may not like the proposal but can, given their huge financial resources, live with it.

Such a finding would be much more harmful to the more modestly endowed DP user community, which probably has a bigger stake in this proceeding than the vendors, whose lofty statements of equity, principles and national security may be seen by the government as masks for more down-to-earth economic concerns.

For users, there is no question of posturing or game-playing; this is a basic question of dollars and cents and bottom-line robustness. Why should users not let the IRS know about their concerns? Users, unlike vendors, don't have boundless resources and Washington representatives to speak for them. They cannot be expected to descend on IRS offices in droves. But a simple card or letter, when matched by hundreds or thousands of others, could have a greater effect on the IRS than all the protestations of the three-piece-suited attorneys who have fought the battle so far.

The government will soon decide how to finalize the tax credit regulation. If the user community has strong feelings about the outcome of this controversy, it should let the government know. The appropriate office is: Internal Revenue Service, Legislation and Regulation Division, Office of Chief Council, 1111 Constitution Ave. N.W., Washington, D.C. 20224.



Hanging in There

LETTERS

'Who Benefits?'

In Charles P. Lecht's article "A Man's Hologram Is His Castle" [CW, April 4], Lecht invites us to imagine an artificial, holographic world that is indistinguishable from reality and of potentially global benefit to mankind.

I believe that the dangers of such a world have not be overstated, as Lecht claims. Any part of reality that mimics the whole (and seems more fun) encourages us to choose the fake — a kind of ultimate addiction. But it is quite possible to die of malnutrition while eating food that looks, tastes and smells like the real thing.

I don't oppose the technology Lecht describes; I can't wait to see it. But I protest the sales-pitch style of the article. It is too reminiscent of ad campaigns for insecticides or Barbie Dolls.

The questions "Who benefits?" and "What does it cost?" are still relevant. If, for example, the beneficiaries of Lecht's magic world are a few thousand pirates who escape into space (with, of course, holographic copies of the best and most beautiful experiences Earth has to offer), while the cost is a dying planet stripped of real trees, grass and animals, then I don't want to play — in fact, I don't even want the game in my town.

It is not enough to put small disclaimers ("this is an illusion") into every artificial perceptual field; no one pays much attention to current versions. Perhaps a better approach would be to require residuals for copies. If, for example, a blue-sky experience retailed for \$2,000, then \$1,000 of the price would be spent controlling (real) air pollution, and if a gourmet restaurant experience is used, 50% of the gross would go to solving (real) problems of food distribution.

We are making critical choices dai-

ly and cannot simply wait for a total-comprehension machine to make everyone nice. And if, as some have suggested, we are already living in a copy planet, isn't the first order of business to find out why this particular set rather than some other and whether the show is due to close after next Friday night's performance?

Samuel W. Sade
Programmer

Mart, Texas

Know the Audience

Joan Wackerman's and Jim Gleason's In Depth article, "Manual Dexterity" [CW, March 28], was excellent. The information presented may be applied equally to users and service manuals, especially now that most electronic equipment manufacturers limit field service activity to a printed-circuit-board level.

One point that is missing is something that applies to all communications efforts: know the audience.

Each document produced to support a product must be as carefully targeted as the product itself. A publication designed for use by an equipment operator should primarily concern itself with user information.

The documentation produced at United Technologies Com Dev must, by the nature of the document reader, be multilevel. To avoid problems of underkill or overkill, United Technologies uses a structured-manual system that clearly presents information at specific reader levels.

Once the audience is identified, the writer must write to that audience's collective technical level. It isn't always easy, but it is always necessary.

John Glenn
Technical Writer

United Technologies Com Dev
Sarasota, Fla.

LECHT ON SCIENCE/Charles P. Lecht

The Office of the Future's Blast-Off

From clerk to chairman of the board, we carry out our duties as though partially blinded, groping through the complex and uncompromising maze of our workday obligations. Our feelers extended, transmitters sending and antennae receiving, we live each day signaling and signing to one another through whatever natural and artificial means we can appropriate to achieve whatever purpose, hoping, in the face of the evidence, for better days. I presume this means greater ease of predictability in the process of fulfilling our material requirements, a more expansive peace, a world in which more time is available for contemplation and the satisfaction of our pleasurable physical and spiritual needs.

In these pursuits, the tools we use, our factories and our offices, even the very plans we make, reflect our inherent shortcomings in all-too-obvious ways. Thus, it is rare to find an office without at least one hearing aid, a few speaking aids and other such devices that may sharpen or enlarge upon our native senses and capacities.

In this manner, we venture beyond the operational potential of the human physical plant in the exercise of its innate powers and annex to the realm delimited by those powers vast new territories in which we, if not they, may function.

Narrow Bandwidths

The need for such amplifiers of our bodily powers speaks to the limitations we must recognize as integral to the normal constitution of our species and provides persuasive and eloquent testimony to the narrow band-

This is the second article of a two-part series on the office of the future.

widths within which nature would have us operate. The total range of sensory perception and physical strength allotted by nature even to the best of us, when considered alongside what it could be, expresses the same ratio as the years of our lives viewed against the notion of eternity.

And in view of our legendarily defective memory, not to speak of logical, computational and associative skills, it seems to me that the human intellect, to the degree its function is affected by these, suffers in the same way the physical self does.

For a timely example of this unfortunate weakness, we need only consider the equally untenable, mutually exclusive positions that different camps have assumed with respect to arming, or failing to arm, ourselves with nuclear weaponry.

Intellect Needs Improving

Anyway, while we may not know much, we do know some things; one self-evident truth is that the human intellect needs improving as fast as possible.

We spend up to half our lives going to school and giving our attention to the process of learning one thing or another. And we properly applaud those who succeed in learning the most.

Nonetheless, without minimizing our achievements, they are not happening quickly enough to enable us to solve problems relating to supply

and demand, human conflict, law and order and a host of other vital areas of concern.

And so we are profoundly committed to the creation of ever more various and impressive supranatural powers to boost the performance levels of our intellectual amplifiers and to delivering these to our places of work. There they energize intelligent devices, personal computers and the like.

Arriving via cable, broadcast and telephone lines, wrapped in hardware and software packages, artificial powers in intellect amplification are streaming into our offices, like electronic soldier pawns converging on some giant, chessboard drilling field. The harried executive, feeling, perhaps, like a latter-day sorcerer's apprentice, can hardly sweep out the residue of past innovations before their replacements arrive.

Individuals upon whom such powers as these devolve can, quite "naturally," perform feats impossible for those of us caught in the toils of mere nature. Need we look any further than our astronauts for proof?

In fact, I believe that in the example of modern astronauts, the clearest demonstration of the scope and kind of powers obtainable through artificial strength and intelligence is to be found. For in no instance could it be any clearer that in the absence of such powers, achievements of this magnitude and importance would remain impossible.

Cockpit Environment

This brings me to the office of the future. The environment in the cockpit of the space shuttle *Challenger* is

an embryo of our future office. It is the command and control center of a flying cyborg whose mission is to transcend the last frontier of nonpowered flight, achieve orbital equilibrium, perform its assigned mission and return safely to Earth. An updated, semirobotic centaur, part human, part electrical/metallurgical/chemical, its systems are synchronized to anticipate each other's needs without regard to or intervention by subsystem species, human or otherwise.

Thus, the organic harmony in which the cockpit's occupants, devices and persons alike participate is astounding. Factor in the additional dimension imparted via ground-control synchronization with on-board events, and we are face to interplanetary face with an unparalleled exercise in man/machine symbiosis each and every time the shuttle flies.

I say unparalleled because this symbiosis holds true not only in the limited area of the cockpit itself, but equally in connection with numerous remote stations of widely disparate distance and location.

With each flight, a choreographed, time-sequenced event requiring precision patterns of device commitment and decommitment, and the mission personnel submitting to the control of a master flight program, we begin to see the outlines of something like a vast integrated digital services network (ISDN). In the context of this image, the craft itself might be seen as a cyborg satellite.

But where in all of this is the link to the office of the future? Is the concept of the shuttlecraft system I've

(Continued on Page 38)

HUMAN CONNECTION/Jack Stone†

Great Expectations? A Look at New Software

Eureka! So this is the Wang Laboratories, Inc. OIS Alliance 200. I am in Valhalla — or so I thought until I started checking out the software and then, well ... Here is my sorry saga:

After months of impatient waiting to work with one, I jumped on the opportunity to teach a management literacy program at an organization that had recently installed an Alliance.

My interest was peaked in part by the sales literature, which was nothing short of brilliant, and in part by the dearth of technical data. I was positively enchanted with the notion of Visual Memory (VM) — maybe it was the name that turned me on — a capability touted by Wang as a breakthrough in data access and retrieval.

Let it be known that some of my best friends are Wang people. So it is not my intention to embarrass them or the company, nor is it my desire to single out Wang for selling puffery. But I really was very excited about Alliance. I had hoped that it would compensate for deficiencies in the predecessor OIS List Processing (LP)

software.

The point of this piece is, first, to announce the umpteenth occurrence of software overstatements and underperformance — as I adjudge them; and, secondly, sadly to relate the most recent occasion of my succumbing to glowing reports of software in four-color, glossy, marketing propaganda sheets and then finding myself terribly disappointed.

Keying Actions

One technique I use for teaching literacy on minis is to keep attendees in lockstep to minimize keyboarding errors. A problem I continually have with OIS LP is that certain simultaneous keying actions — involving, I suppose, multiple storage accesses — result in extended response times. On rare occasions, such actions result in software failures at about half the terminals. However, restoration is quick — one tap on the cancel key does it.

And Alliance VM? At least on the installation I was using, response times under such conditions were far worse and terminal failures were

much more frequent. Furthermore, terminal restoration required switching off and relogging on — a real pain for a training environment.

LP had some neat features, such as batch record change, batch delete, machine-generated record sequence numbers and select record logic based on Boolean choices of field values. These capabilities were dropped in Alliance software, or at least they weren't so obvious that I could easily find them.

Some Improvements

To be fair, VM offers some definite improvements over LP. For example, one of LP's supervisory functions for file index is an unadulterated abomination — come to think of it, most of those functions are bleak. Collectively, they did have one redeeming feature: You could safely tuck them away behind a password-protected screen and then lose the password.

The VM file index is a pure delight, a real speedy Gonzales showing only one line per file entry, a display concept that has been around

for decades, but apparently only recently came to the attention of Wang designers.

But then the designers seemingly fell in love with the idea, because the file index screen is automatically displayed every single time one selects the edit file option. The same situation applies to the display of print queue indexes. It's a shame that Wang software folks lack a flair for the dramatic, like giving users an option to suppress the indexes.

Then, too, VM came through with vastly improved techniques for displaying selected fields and sorting records.

Unlike LP, VM has a function for directly printing a selected file, although being forced to use an unlabeled program function key to do so is somewhat awkward.

Finally, it was bad enough that LP had no end-user capability for performing arithmetic operations on selected records, OIS being a high-speed computer. But it was worse that the Alliance VM — Wang's latest and greatest — doesn't have one either.

Office of the Future: A Cockpit Environment

(Continued from Page 37)

briefly outlined here at all applicable to the corporate business picture? Of course it is. And so is the "astronautical" office of the spacecraft's cockpit; our office of the future is a dynamic, moving place filled with gleaming panels of meters, joysticks and both actual and transmitted imagery.

It is a mission-oriented space in which interpenetrating levels of co-operation between person and person, person and machine and machine and machine express a dynamic, functional axiom, requiring no additional explanation or encouragement.

This is no private place; participatory involvements reach out both laterally and vertically in the man/ma-

chine mix of things. Privacy is secured by retiring to an executive sleep-space beyond the office confines.

The Master Plan

In the corporate plan — the master program that drives, regulates and fine-tunes the entire system — our pilot becomes president and our copilot becomes the executive vice-president.

The duties of the flight engineers are shared by the comptroller, plant manager and marketing manager. Remote facilities are linked via ISDN technology, with various devices for successful execution of the corporate mission, committed and decommitted in a kaleidoscopic scenario of

master/slave relationships orchestrated by "mission control" — the boardroom.

Occupying our office of the future is the executive of the future, a graduate of our school of the future. After years of preparation, including operational simulations of such extraordinary sophistication that his native senses will distinguish only with hesitation between the actual thing or experience and its simulacrum, our intrepid future executive will work his way (up?) to the corporate pilot's seat, from which he will guide the operation of the corporate network.

Participation and loyalty will have to replace legislated obedience as the guiding principles of business before

the office of the future can fully emerge. But when it does — and it will — the benefits and the gratification will be so apparent, so accessible, that the idea of the office as a place of work will be consigned to oblivion, where it will remain, unlamented.

In its place, a seamless counterpoint of technological, political psychological and economic harmony will make itself heard. At that point, we can readily begin to visualize our spaceship Earth itself as an office of the distant future in the unbounded network of galactic things to come.

Lecht is president of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

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LETTERS

Users Not Left in Lurch

The article "Group Keeps Users From Feeling Left in Lurch by New Offerings" [CW, March 28] states that Informatics General Corp. "urges users to 'start with the book, then use your imagination' to make the most of the product. That... makes users feel that they have been left in the lurch."

We at Informatics recognize the immense value of Mark IV User Groups and encourage the exchange of ideas that these groups offer. After providing our users with a grounding in Mark IV through our documentation and course offerings, we encourage them to use their imaginations when working with our products. However, we hardly feel that this is equivalent to leaving them in the lurch. We recognize that with a tool as powerful as Mark IV, every possible thing that can be done with it won't fit in our manuals.

By giving our users a thorough presentation of Mark IV concepts in our documents and courses, we believe that when they are confronted with a problem not explicitly explained therein, they can use their imaginations to apply these concepts and solve the problem. We also provide technical assistance to our customers through our headquarters support group.

Anne Smith
Product Manager

Informatics General Corp.
Canoga Park, Calif.



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FOUR LITTLE WORDS THAT STRIKE FEAR IN THE HEART IN THE 1980'S.



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Every day another business goes "on line." Every day the world becomes more dependent on computers. And every day it becomes more important for the world to have a computer that won't go down, or even skip a heartbeat.

Over the past decade there have been computers designed to withstand hardware failures and eliminate downtime. However, all previous approaches depend heavily on software techniques to provide fault tolerance. A comparison of these old systems with the new Stratus/32 Continuous Processing™ System will illustrate how far we have come in one leap, by using advanced hardware technology instead of complex software.

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run without major changes.

An added benefit of the Stratus fault tolerant design is that you can expand your system with additional processors as your computing needs grow. In fact, you can have up to 32 fault tolerant processors, 2000 communication lines, and 100 billion bytes of storage in a single Stratus system.

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'We're Here to Help'

I was disturbed by William C. Ramsgard's In Depth article "Stop Documenting" [CW, March 21]. While Ramsgard points out that data processing has just discovered the user, he totally ignores one remaining missing link: the technical writer, or documentation specialist.

The problems of unusable, jargonized documentation, underdocumentation or overdocumentation are familiar to the technical writer, who is professionally trained to produce usable DP specifications, manuals, guidelines and so on. Programmer/analysts are best employed doing programming, analyzing and designing systems. They are poorly equipped to document as well. We should not blame them when they complain that they do not have time for documentation.

A good technical writer cooperates smoothly with the programmer/analyst to obtain just the right amount of documentation. He works with the source material to structure it and present it clearly or develops source material as necessary.

The writer, or documentation specialist, should be brought in at a very early stage in design: when the facts about the existing system are being collected. He will usually be able to assist with the interviewing (writers are trained to interview) and in clarifying the processes that are to be automated. At the same time, the writer offers a sympathetic liaison with the user, who may be confused by the DP jargon. This will be espe-

cially valuable when the user manual is to be written. The writer knows exactly where a diagram or flowchart is better than a thousand words or where a narrative is truly needed.

While much of Ramsgard's advice is entirely justified, it is nothing new to the professional documentation writer.

I would like to say to analysts, programmers, management information systems managers, data base analysts and systems designers out there: We, the documentation writers, are here to help you. We are professionally trained to take over your burden of documentation. Don't just look for us when underdocumented, unwieldy

systems have become incomprehensible. Let us provide for you from the beginning the kind of sparse but solid documentation that can make your work so much easier. You and your users will benefit.

Maria Maxfield
Technical Writer

Information Services Division
American Cyanamid Co.
Clifton, N.J.

Transfer of Ownership

In his reader commentary "Who Owns Software Written Under Contract" [CW, Feb. 7], Roland Bowns notes correctly that unless an employer-employee relationship exists, or a contract provides for the transfer of ownership of copyright interests, those interests remain with the writer of the software.

Two recommendations were made. It was suggested, first, that the software writer might be hired as an employee. In many instances, however, the prospective employer might prefer to avoid this step or the software writer might prefer to retain his free-lance status. The second suggestion was to include in the contract a provision that the software should be treated as a "work made for hire."

Under the present copyright law, the "work made for hire" approach should be taken with the utmost caution. It is not enough to include such a provision in a contract. It is also necessary that the work fall within one of the categories listed in the statute.

To qualify, the work must be "a work specially ordered or commissioned for use as a contribution to a collective work, as a part of a motion picture or other audiovisual work, as a translation, as a supplementary work, as a compilation, as an instructional text, as answer material for a test or as an atlas," (17 U.S.C. §101). Unless the work falls within one of these categories, it will not be treated by the courts as a "work made for hire" even though it is so characterized in the contract. If the contemplated software will fall within one of the statutorily defined categories, a "work made for hire" provision should be satisfactory. Otherwise, it should be avoided.

Fortunately, a third alternative is available. The copyright law provides for the transfer of copyright ownership "by any means of conveyance," including "an assignment, mortgage, exclusive license or any other conveyance, alienation or hypothecation," (17 U.S.C.A. §§201(d)(1), 101). Such a transfer may be terminable by the transferor after 35 years, but given the relatively short life spans of most software, that would not usually be a problem.

John F. Niemeyer
Directing Editor

West Publishing Co.
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Stan Domalewski is Director of Management Information Systems for Brinks, Inc. He's been around computers and payrolls long

enough to know what's worthwhile. And what isn't.

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Works With OSI's 'Omnicom'

'Omnalink' Ties IBM Micro, Mainframe

FORT LEE, N.J. — On-Line Software International, Inc. (OSI) has announced Omnilink, an integrated software package designed to allow intelligent communications between an IBM Personal Computer and an IBM mainframe or plug-compatible mainframes running under OS and DOS with CICS.

Omnalink works with Omnicom, the vendor's electronic mail software that

runs under IBM's CICS. This product acts as a mainframe-based communications center, linking IBM Personal Computers, standard IBM terminals and word processors, the vendor said, and allowing downloading of any data bases supported by CICS on the mainframe.

For microcomputers, Omnilink provides a combined set of proprietary software packages known as Omnimicro. Also

available for use in a stand-alone mode (with no mainframe communications link), Omnimicro is an applications generator and query language intended for use by executives, according to OSI. Omnimicro provides built-in applications tools such as word processing, spreadsheet reporting and analysis and graphics capabilities, the vendor noted.

The other essential component of Om-
(Continued on Page 46)

Boole & Babbage Introduces Aids For IBM's Info Center Concept

By Jeffry Beeler

CW West Coast Bureau

SUNNYVALE, Calif.— Boole & Babbage, Inc. has developed an integrated set of software tools and educational/consulting services aimed at managing the systems growth and other problems that are likely to accompany the adoption of IBM's Information Center concept.

Slated for formal introduction later this spring, the company's Information Resources Planning and Control (IRPC) system reportedly will do for corporate data facilities what the Manufacturing Resource Planning concept has already done

for industrial shop floor activities.

With IRPC, Boole & Babbage seeks to provide the tools and other necessary resources that will allow general techniques of corporate planning and control to be applied to the problems of information systems management. The ultimate aim of IRPC, therefore, is to enable companies to manage their information as they would any other resource and to run their systems activities as a business within a business, a company spokesman said.

IRPC will equip firms to implement many of the same planning and control
(Continued on Page 48)

'Omegamon/MVS' Enhanced for IBM

LOS ANGELES — Candle Corp. has announced an enhanced version of its Omegamon/MVS and Dexan/MVS performance monitoring software, which will now support IBM's MVS/Extended Architecture (MVS/XA) operating system. At the same time, the company unveiled plans to support an External Monitoring Mode for Omegamon/IMS and Dexan/IMS software that monitors the performance of IBM's Information Management System (IMS).

Support features for MVS/XA include
(Continued on Page 50)

DBMS Helps Navy Cut Development Time

SAN DIEGO — The Fleet Accounting and Disbursing Center for the U.S. Navy's Pacific Fleet (FAADCPAC) implemented a relational data base management system (DBMS) and cut program development time by up to 90%.

According to Capt. Fred Perrill, commanding officer of the center, "Program development has been so successful that we have, to my knowledge, the only automated bill-paying system within the Navy that fully complies with the law — including mandated cash management procedures and on-time payments. Other systems require that at least part of this work be done manually."

Using the relational DBMS, the center disburses about \$30 million worth of payments for 28,000 invoices; yet the staff re-

'... the [Navy's accounting] center disburses about \$30 million worth of payments for 28,000 invoices; yet the staff responsible for hardware and software maintenance numbers four people.'

sponsible for hardware and software maintenance numbers four people. The key to the operation is Oracle Corp.'s Oracle relational DBMS running on a Digital Equipment Corp. VAX-11/750 minicomputer.

FAADCPAC performs accounting services for the combat forces of the Pacific Fleet. Disbursements range from under \$10 to over \$1 million on a single check,

according to Roy Lunday, director of management systems for the center.

When Perrill came to FAADCPAC in early 1981 he found a Sperry Corp. 1140 and IBM 360/30 processing four separate bill-paying systems in batch. A former relational DBMS user, he decided to pursue the DBMS alternative.

"A key advantage of a fourth-level language such as Oracle is the flexibility to bring users in at every level of development, modifying the program as you go," Perrill said. "We were able to define the system broadly and start programming almost immediately."

After taking bids from several hardware vendors, FAADCPAC selected the VAX with 8M bytes of memory, over 300M
(Continued on Page 46)

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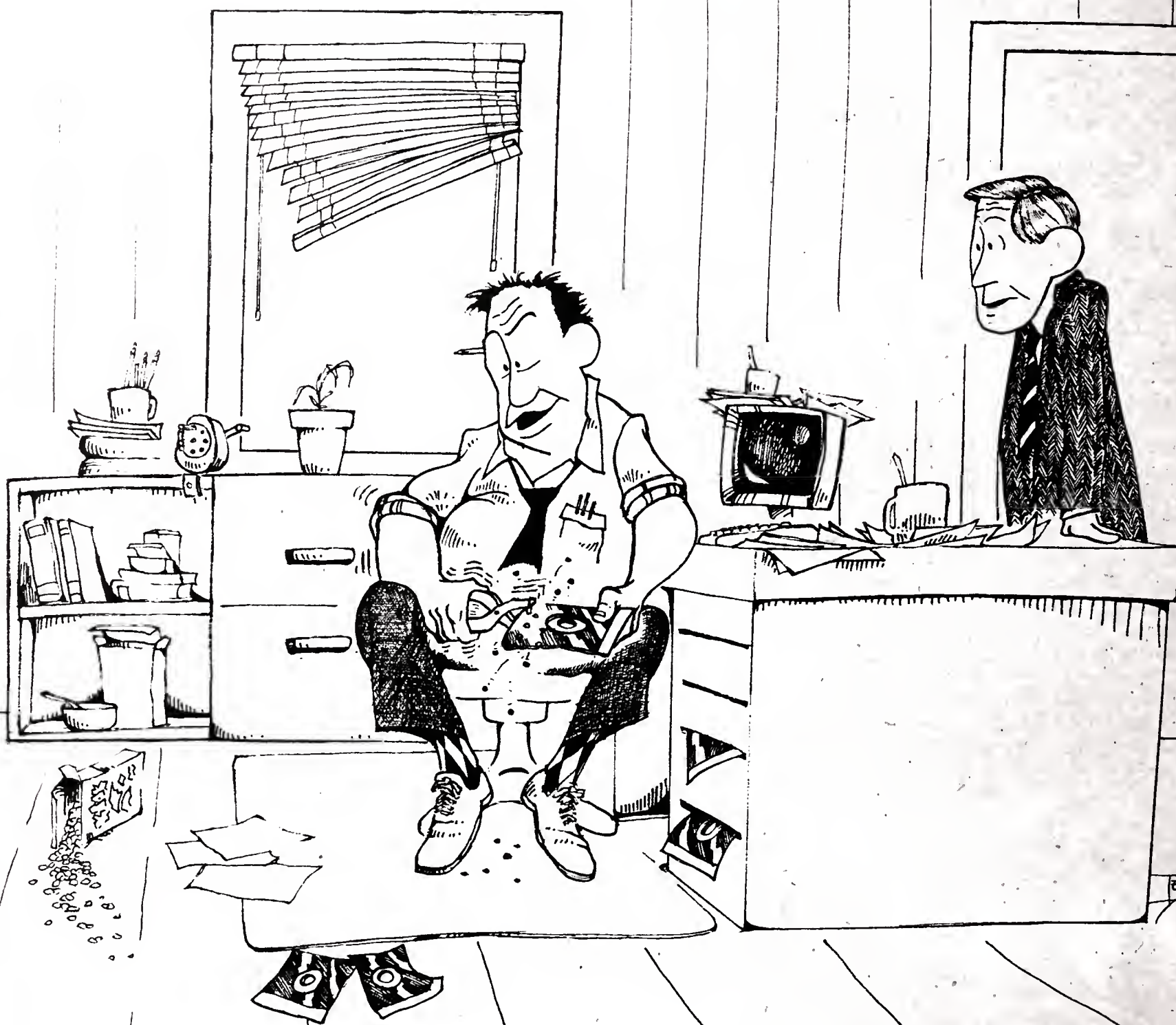
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The OA Focus section of the next *Computerworld OA* will provide comprehensive coverage of data bases, software conversions, decision support systems, information centers, the user interface and much more. We'll showcase vendor directions, what benefits are available now and what users should plan for in the future. We'll summarize the latest information from developers and highlight emerging trends in order to bring both long-term and specific guidelines to those responsible for planning and purchasing software for their organizations.

In addition to the OA Focus on Software, *Computerworld OA* will feature a survey of real users of information centers, present a case history of a large bank user and will have articles on subjects such as cost justification, ergonomics and remote work sites.

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Geisco 'FCS/EPS' Available via T/S Service

ROCKVILLE, Md. — General Electric Information Services Co. (Geisco) has announced the availability of the financial control system/evaluation planning systems (FCS/EPS) decision support system via the company's IBM-compatible Mark 3000 time-sharing service.

FCS/EPS, developed by Evaluation and Planning Systems Consultants, Inc. of Windham, N.H., is used by Geisco's clients in banking, manufacturing, financial services and energy. The system reportedly can be

M. Bryce Out With IDMS Link

CINCINNATI — M. Bryce & Associates, Inc. has developed an interface between Cullinet Software, Inc.'s IDMS and M. Bryce & Associates' Automated Systems Design Methodology (Pride-ASDM).

Pride-ASDM is said to be an integrated and automated approach for the specification, analysis, design, development and implementation of information systems.

Its nucleus is the Information Resource Manager, a systems development tool that catalogs and cross-references data, systems and organizational components.

Pride-ASDM is currently operational on more than 20 machines, including IBM 370, 4300 and 30 series configurations, according to a spokesman for the vendor.

Pride-ASDM costs \$80,000, and the IDMS interface costs \$7,000 from 1248 Springfield Pike, Cincinnati, Ohio 45215.

Two Models Out For Transport, VM/CMS-Based

WALTHAM, Mass. — Shycon Associates, Inc. and Finreport Computer Services, Inc. (FCS) have announced the availability of two transportation planning models on the latter's IBM VM/CMS-based computer service.

Designed for use by shippers and carriers, the models are intended to handle the consolidation of small shipments and the management of private trucking fleets.

One model, Cnet, evaluates the economies involved in consolidating less-than-truckload shipments into larger shipment sizes for savings in freight charges, the vendor explained.

The other model, Tnet, determines the best mix of private fleet vs. common carrier to satisfy a firm's full truckload shipping requirements at lowest cost, according to the vendor.

The models were developed in conjunction with Leaseaway Transportation Co. Charges for the use of either of the models can be on an incremental basis or a fixed monthly charge.

Shycon Associates is located at One University Office Park, Waltham, Mass. 02154. FCS is headquartered at One Moody St., Waltham, Mass. 02154.

used for such applications as investment analysis, long-range planning, budget development and control, cash flow forecasting, merger and acquisition activity, rush analysis, "what-if" scenarios and statistical studies.

The FCS/EPS system is said to include its own data manager, editor and report generator. Other features include financial graphics, hierarchy and consolidation, data management and financial planning and analysis, the vendor said.

No fee is charged for installation of the system, and the charge for use of the system ranges according to volume of usage. More information is available from the vendor at 401 N. Washington St., Rockville, Md. 20850.

Quantitative Software's 'Slim' Enhanced

MCLEAN, Va. — Quantitative Software Management, Inc. has enhanced its Software Life Cycle Management (Slim) model, reportedly providing the user with the capability to measure the effective productivity of building software in an organization.

Slim can be used on Digital Equip-

ment Corp.'s Decsystem-2060 through the time-sharing services of American Management Systems, Inc. or as a stand-alone system on the Hewlett-Packard Co. 80 microcomputer series.

Slim's estimation mode reportedly forecasts software reliability (mean time to failure) and explicit risk pro-

files on schedule and cost.

Slim is said to provide senior managers with an integrated approach for getting software numbers they need to evaluate capital investments in the software environment.

Slim is priced at \$25,000 annually from the vendor at 1057 Waverly Way, McLean, Va. 22101.

S*W*A*TTM

SOFTWARE WALK THROUGH

A prescription for immediate relief from the EOTF syndrome

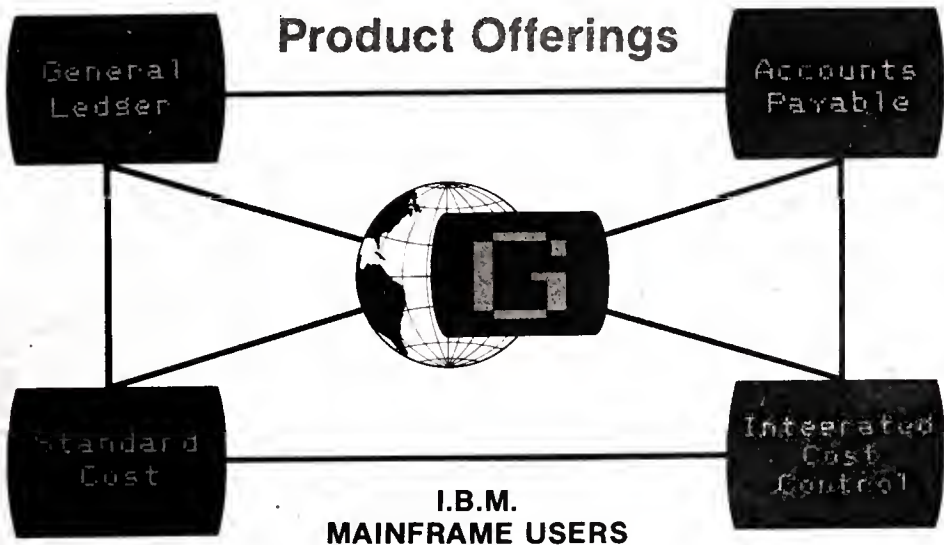


These are trying times for those who are involved in evaluating financial software. There are lots of products and lots of claims as to how easy each product is to install and to use and how well each system meets individual requirements. The prospective buyer has got to be apprehensive since his decision is irrevocable. Once money has changed hands the product must be installed regardless of whether or not expectations have been met or the vendors obligations have been fulfilled or regardless of the time it takes in-house staff to install it. In medical terms this anxiety neurosis is called the EOTF (egg on the face) syndrome, characterized by profuse sweating and spastic twitches in the right shoulder.

THE ONLY TREATMENT for this common malady is the five day S*W*A*T plan. S*W*A*T stands for 'Software Walk Through' a unique 'try it... you'll like it' offer from Global Software, **The Confident Vendor**. So confident, we invite you to our offices, write conversion programs, parallel process on **our computer**, build all of your variable specifications and send you home at the end of a fun-filled week with a complete, running system.

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COMPUTER TYPE _____

Navy Cuts Development Time With DBMS

(Continued from Page 43)

bytes of storage and 22 DEC VT100 terminals. The group selected Oracle because it "contained the greatest array of desirable attributes," Lunday said.

"We had been working extensively with hierarchical data bases and were in a position to appreciate the differences," he noted. "For example, in lengthening a field on an entry screen using a hierarchical DBMS, we would have dumped the whole data base, registered a new schema and reloaded the file. With Oracle, we just bring up the table, re-describe the data field and write it back."

Systems programmer Jean Rogers remarked that in traditional Cobol,

changes in the table structure required all interfacing programs to be modified as well. "In our case, this typically involved six to seven different programs that would take two man-weeks to modify," she said. "With Oracle, the process is a matter of minutes."

Oracle represents data in two-dimensional tables and employs SQL (Sequel), an English-like data language developed by IBM, to create file structures and entry screens, query selected records and format them into reports.

Objectives were formulated and specifications written with input from personnel and the advice of a consulting and programming firm. Lunday said Oracle enabled the firm

to convert specifications for an entry screen into code in less than a week. In addition, the program gave users an opportunity to rearrange fields, change lengths and allow for more entry information in special cases. The entire system was written in Oracle in less than six months, he said.

The system generates a variety of reports. For example, a series of backup reports for in-house and Treasury Department use list the check register by check number, amount and payee. Summary reports detail the total dollar activity by type of contract or type of payment.

Lunday noted that federal laws to ensure public accountability make FAADCPAC's operation more complex than that of a comparable pri-

vate sector firm. "We must provide the same level of security, whether for one dollar or a million," he said.

Changing statutes present a further challenge to an automated bill-paying system, he added. Bills must now be paid "in a manner that is most effective and conservative with the public's funds." "In implementing such a cash management system, program flexibility is essential," he said.

OSI Introduces 'Omnalink'

(Continued from Page 43)

nilink is a query language software facility called Omniquery that is located at the mainframe level. It reportedly provides the mainframe and microcomputers with a mutually understandable communications link. The vendor explained that a user working at a microcomputer can use the application generator to write a custom program and upload it to the mainframe. Since query language software is located at both mainframe and micro levels, the mainframe will understand the request, process the program and ship the results back to the microcomputer. The program alternatively could be processed locally at the micro level. Omniquery will be available on a stand-alone basis for the mainframe in August for \$20,000. The IBM Personal Computer version of the product is available as part of Omnimicro.

Because of concerns about security and integrity of information residing in the central CPU, OSI will offer Omnigard, an adaptation of its existing Guardian CICS-based security software system. Using Omnigard, a company's DP department can control access to information in the mainframe, deciding which levels of data users will have access to and when they can access it. Omnigard also provides a monitoring capability so DP security staff members can track use of the mainframe. The DOS version of Omnigard is priced at \$20,000. The OS version is priced at \$27,500. This component will be available in June 1983.

Omnicom is immediately available at a price of \$25,000, which includes one copy of Omnimicro for communications with the mainframe. After June 1, 1983, the price of Omnicom increases to \$35,000 for OS systems and \$28,000 for DOS systems. After June 1, Omnimicro will be available at a separate fee, starting at \$1,800 for a single IBM micro.

OSI is located at Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

The Information Center and The Development Center... The Micro/Mainframe Connection... Relational Database Management Systems...

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Bull?

Three essential seminars that save you time,
money, and let you cut through the Bull.

As a DP/MIS Manager you're being squeezed. Micros are pouring through the door like water...end-users are trying to tackle your application development backlog, and they're coming to you for advice on the technology they need to do it. At the same time, salespeople are telling you that all the pieces are available now, and that they have the ideal solution for your needs.

The pressure is on. But, who's right? How do you afford the time to examine all the available products, cut through the marketing dazzle, and determine which products, if any, can help you get the job done, bring everything back together, and stay ahead of the game?

Software and Micro Decision Symposiums Independent in-depth analyses

Each two-day symposium provides you with the opportunity to find out the real story, and about the various products and implementations themselves. Here are some comments from past attendees:

"...extremely informative. I would estimate that we saved some three months of research. The presentation was truly unbiased and a refreshing change."

Jeanette Pearman
Information Center Manager
Albuquerque National Bank

"We thought we had done our homework beforehand...but we found so many new insights into the competing products that most of our preliminary legwork was invalidated. I can't imagine any attendee not getting more than his money's worth of decision support from the Software Decision Symposium."

William D. Masters
Michael Reese Hospital
and Medical Center

"Most helpful...anyone reaching a point where a decision is to be made should not do it before attending this symposium."

Henri Robitaille
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In short, the Merlyn Software and Micro Decision Symposiums present a remarkable opportunity for today's DP/MIS Management to quickly find out which claims can be believed, and which are Bull.

1. The Information Center and The Development Center.

Can you really accelerate the applications development process?

Application Generators, productivity tools, fourth generation languages, end-user query systems, database management systems. They all claim to be just what you need...instant answers to the backlog crisis...but which ones really are, and how do you implement them?

Schedule:

New York City	May 3-4	Chicago	May 25-26
Pittsburgh	May 11-12	Toronto	June 8-9
Baltimore	May 18-19	San Jose	June 14-15

2. The Micro/Mainframe Connection.

The end-users way out...or yours?

What, how, and where you buy are important, but they're only part of the challenge. The real issue is control...control of everything from acquisition to support. What are the selection, configuration, and acquisition criteria? How do you compare micro hardware and software? What about communications and compatibility? How do you integrate micros into the overall systems strategy, and maintain security, data integrity, and auditability?

Schedule

Seattle	April 20-21	Boston	May 17-18
San Francisco	April 27-28	New York City	May 24-25
Dallas	May 3-4	Baltimore	June 15-16
Chicago	May 10-11	Toronto	June 28-29

3. Relational Database Management Systems.

Does end-user computing demand Relational Database?

User-friendly access to data is becoming a critical issue, and Relational Database products claim to provide the answer. Which products really are relational? What about the 'relational-like' products? How do you compare and implement relational technology?

Schedule

Pittsburgh	May 11-12	Toronto	June 8-9
Baltimore	May 18-19	San Jose	June 14-15
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To Register.

To register, or get more information, call (800) 241-9970 or (404) 252-0516. Price per person is \$595. If more than one attendee registers from the same company, in either symposium or any city, the second and subsequent registrants receive a 25% discount. The fee, which must be paid in advance, includes symposium coursebooks, all meeting materials, lunches, coffee breaks and a cocktail reception at the end of the first day.

If your schedule won't permit you to attend, expanded coursebook sets, covering each symposium, are available for \$495.

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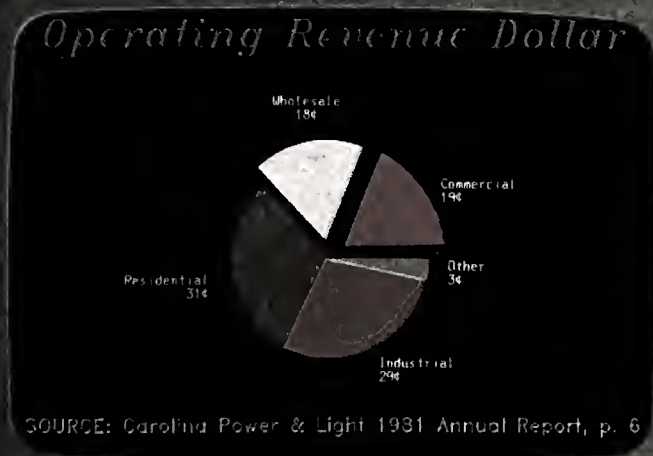
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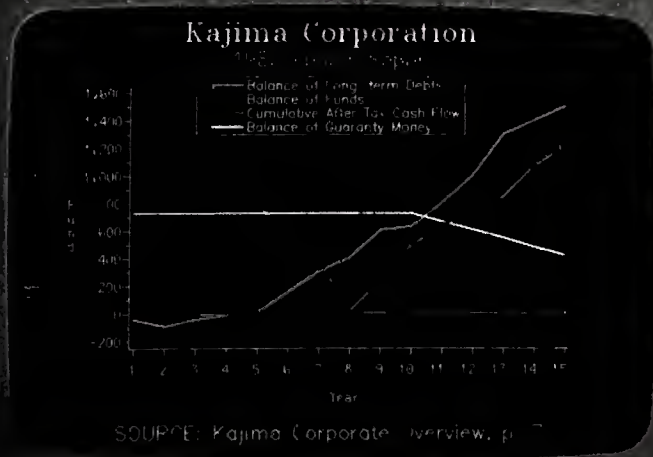
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Choropleth Map of Products



Pie Chart of Revenue



Plot of Funds*Year

TELEPHONE EXPENDITURES FOR TELEMARKETING
(Estimated Figures)

	(In Millions)	
	1980	1976
Residential originated local calls	\$ 1.1	\$ 2.52
Residential originated toll calls	\$ 1.1	2.69
Business originated local calls	\$ 1.1	3.045
Business originated toll, WATS, 800 calls	4.25	2,502
TOTAL	\$ 7.5	\$6,048

Telephone Expenditures



Plot of Load*Time

SAS/GRAPH brings you Instant Replay



Since its introduction in 1980, SAS/GRAPH has provided "state of the art" software for business graphics. Now SAS/GRAPH brings you a new decision support tool—instant replay.

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1 generate numerous graphical analyses and store the results.

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Best of all SAS/GRAPH™ is integrated into the SAS system, so you can get the benefits of SAS for data management, statistical

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SAS Institute GmbH, Rohrbacher Strasse 22, D-6900 Heidelberg 1, West Germany. Phone 06221-29014. Telex 461581.

SAS Software Ltd., The Centre, 68 High Street, Weybridge, Surrey KT13 8BL, UK. Phone 0932-33833. Telex 946138.

SAS Institute (NZ) Limited, Level 9, Greenock House, 39 The Terrace, PO Box 10-109, Wellington, New Zealand. Phone (04) 227-593. Telex NZ 31325.

SAS Software Pty. Ltd., Level 60, MLC Center, 19-29 Martin Place, GPO Box 4345, Sydney, NSW 2001, Australia. Phone (02) 235-2199. Telex AA 71499.



Set of Tools, Services Target IBM's Info Center

(Continued from Page 43)

processes that IBM, in its Information Systems Management Architecture, has identified as indispensable to a well-run computing operation, the spokesman added.

To teach management how to establish information centers and run them effectively, IRPC will provide an assortment of educational and consulting services through Boole & Babbage's Institute for Software Engineering (ISE) and its Applied Software Engineering (ASE) group.

As its name implies, the ISE will serve primarily as an educational institution, with an emphasis on teaching IRPC users the software engineering skills necessary for sound information systems management.

The ASE, meanwhile, will reportedly act as a consulting service and will provide businesses with the expertise they need to plan their hardware capacity and manage their systems performance effectively.

In addition to addressing an information center's needs for systems-related consulting services and education, IRPC will form a strategic framework within which Boole & Babbage plans to add to its existing software product line.

At present, the company's products are divided into two main families — Capacity Management Facilities (CMF) and IMS Management Facilities (IMF), which were introduced in June and August of 1982, respectively. Together, CMF and IMF satisfy a business' capacity planning and performance managing needs at four levels of corporate management — strategic, tactical, control and operational.

Within CMF, Boole & Babbage has already made available several capac-

ity-management software tools, including CMF/Workbench, /MVS Model, CMF/Performance Data Base and /Monitor. In 1983 and 1984 the firm plans to expand the product line further with the addition of the following modules:

- CMF/Business Planner, a decision support system that will reportedly aid both historical analysis and business forecasting.

- CMF/IMS Model, which will support IMS planning efforts by simulating the IBM subsystem's operation.

- CMF/DASD Model and CMF/Network Model, which will help capacity planners analyze, predict the performance of and fine-tune communications networks and direct ac-

cess storage devices.

- CMF/Information Manager, which will capture workload data from various sources, normalize it and then make it available for later query and reporting purposes.

Within the IMF product line, meanwhile, Boole & Babbage has already announced a number of modules, two of which include IMF/Workload Analyzer and MVS/Resource Analyzer, that will perform the same problem-spotting functions for MVS that IMF tools already provide for IMS.

Between this summer and the end of next year, Boole & Babbage is also expected to expand the IMF product family with three additional members:

- IMF/Trend Monitor, which will analyze system performance and post an alert if it notes a discrepancy between observed results and preset objectives.

- IMF/System Evaluator, which will propose remedies for the performance discrepancies uncovered by IMF's Monitors.

- IMF/System Manager, which will automatically start, stop or reassign IMS resources to ensure their optimal use and at the same time maintain service-level objectives.

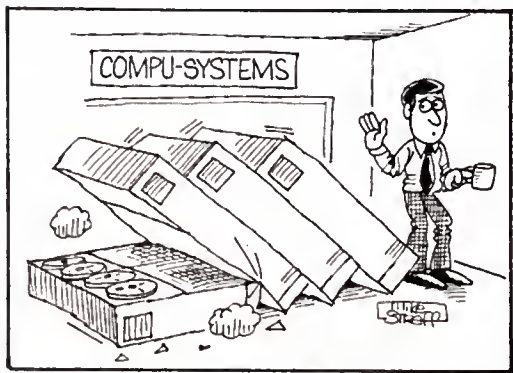
Prices for the upcoming CMF and IMF software modules will range from \$10,000 to \$25,000/unit, according to Boole & Babbage at 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Shipping System To Interface With Mapics

LIVONIA, Mich. — Future Three Software, Inc. (F3) has announced the Automotive Release/Shipping Control System for the IBM System/34, designed for the automotive supplier industry.

The system reportedly will interface with IBM's Manufacturing, Accounting and Production Information Control System (Mapics) applications, existing supplier software or will stand alone. System features include one-time release input via telecommunications, sales projections, automatic cum reconciliation and advance shipping notifications.

The complete system with documentation costs \$12,500 from F3, 33375 Glendale, Livonia, Mich. 48150.



To a world of chaos and confusion, a rational approach to

Today, most organizations realize how critical it is to manage information effectively. After all, information is a key resource. So the choices you make today for data processing,

part, are incompatible.

It is a market characterized by chaos and confusion.

OPEN World—finally, an approach that makes sense.

Northern Telecom has introduced a rational approach to the planning and building of information management systems: the OPEN World.* It is based on the simple concept that all information can be handled in one integrated system. One system that will allow many makes and types of equipment and transmission highways to work together harmoniously. One system that will give you freedom to choose from many different suppliers. One system that will evolve to protect against obsolescence.

The OPEN World is a planning framework embodying these concepts, and a program for the introduction of products and features to enable you to plan and build optimum information systems, designed around the key common element—communications.

We're backing the OPEN World with a research and development commitment of one billion dollars to be spent on R & D in the next five years on OPEN World systems, products and features.

The Five C's—five criteria to judge our approach. Or theirs.

There are five key criteria against which any information management system or component should be evaluated.

1. Continuity.

The system or equipment should be able

The OPEN World

A corporate commitment

Northern Telecom's commitment reflects the importance of information to the future of all organizations... to business, large or small, government, and others. Information management is fraught with complexity... in technology... in the diversity of products... and in a bewildering array of suppliers.

It is to this environment that Northern Telecom brings "Open Protocol Enhanced Networks"—OPEN World—universal information management systems through communications.

Communications is the common denominator for effective information management.

OPEN World is intelligent systems that can evolve and grow to meet any communications requirement.

OPEN World is versatile, planned information management... communications products and a universal planning framework.

This is Northern Telecom's commitment to information management... OPEN World.

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Walter F. Light
Chairman of the Board
and Chief Executive Officer
Northern Telecom Limited

Edmund B. Fitzgerald
Edmund B. Fitzgerald
President
Northern Telecom Limited

OPEN World: our commitment to information management systems that meet the Five C's—continuity, compatibility, congeniality, control and cost-effectiveness.

voice and data communications, word processing and image communications will determine, to a large extent, your future success.

But deciding on an information management system can be very complex.

Obsolescence is a constant concern. Because of the rapid pace of technology, today's innovation too often becomes yesterday's generation. To compound the problem, the needs of your organization are also constantly changing. How do you know what your requirements are going to be next year?

Also contributing to the complexity is the ever-growing number of suppliers offering a vast array of products and services. Products, which for the most

An example of continuity: we have evolved the telephone network to allow yesterday's equipment to work as effectively as today's.



Guideline Set Updates SDM/70

PHILADELPHIA — AGS Management Systems, Inc.'s Systems Development Methodology (SDM)/70 has been enhanced by the addition of a two-volume set of project administration guidelines.

The guidelines include: a description of a state-of-the-art DP organization structure with instructions on creating a project office, instructions for performing a project viability study and system certification procedures.

Also included are guidelines for setting up steering committees.

A single-site perpetual license for SDM/70 costs \$39,500 from the firm at 320 Walnut St., Philadelphia, Pa. 19106.

Access Control Facility Enhanced

LOS ALTOS HILLS, Calif. — The Cambridge Systems Group has announced Release 3.1 of its Access Control Facility 2/VS1 (ACF2/VS1), designed to provide security enhancements as well as improved audit and administrative capabilities.

ACF2/VS1 runs under IBM's MVS or VS operating systems. IBM's CICS controls under ACF2/VS1 reportedly have been enhanced to include file- and program-level protection in addition to transaction control currently provided.

ISI Expands Tool to Fit VAX-11s

BURLINGTON, Mass. — Interactive Systems, Inc. (ISI) has expanded its Interactive System Generator to include Digital Equipment Corp.'s VAX-11 superminicomputers.

The new release is said to facilitate the development of Cobol programs using menus. Inquiry, input and update programs can be generated utilizing any file access method, the

vendor said.

Source code can be customized to accommodate individual installation programming standards. A library feature allows programmers to build and store user-defined procedures.

The package includes an interface to Scope, ISI's forms manager. It costs \$5,000 from ISI at 131 Middlesex Tnpk., Burlington, Mass. 01803.

The system is said to provide expanded auditing capabilities of end users; the Read-All facility allows auditors, in read-only mode, access to all data sets. In addition, cross-reference reports, such as user-to-user resource and resource-to-user, are provided.

The package sells for \$21,000. More information is available from the vendor at 24275 Elise, Los Altos Hills, Calif. 94022.

Softool Unveils Control Unit

GOLETA, Calif. — Softool Corp. has released Change Control Environment (CC), said to automate the management of software changes and their documentation.

CC reportedly controls who can make changes and to what components, thereby eliminating many unworkable manual procedures. It provides features such as automatic reconstruction of previous versions, problem tracking, difference and management reports, access control, archiving, compression, encryption and automatic recovery.

CC is a stand-alone component of Softool, which is an integrated set of tools available on Digital Equipment Corp. VAX-11, Data General Corp. MV, Gould, Inc. SEL Series 32 and IBM 360, 30 and 4300 series computers.

A permanent license for CC is \$12,000, the vendor said from 340 S. Kellogg Ave., Goleta, Calif. 93117.

Xerox Package Fits DEC Minis

LOS ANGELES — Xerox Computer Services has announced a capacity planning component for its Xerox Manufacturing System running on Digital Equipment Corp.'s VAX-11/730, 750 and 780 minicomputers.

The capacity planning package is said to provide manufacturers using DEC hardware with a complete closed-loop system with integrated financial, manufacturing and distribution software.

The software reportedly provides a direct interface with material requirements planning, factory order control and cost and engineering data control applications within the Xerox system.

The package is priced at \$8,000 under a perpetual license agreement. More information is available from the vendor at 7899 La Tijera Blvd., Los Angeles, Calif. 90045.

Northern Telecom brings the first information management.

to evolve to meet future needs, to accommodate future technological developments, and to provide new features. Only in this way can it be "obsolescence-proof."

not lock you in to a single source or limit options in the future. And the system should also provide the tools to control the cost and flow of information in your organization.

5. Cost-effectiveness.

The bottom line. Long-term financial considerations, as well as initial cost, must be

considered.

All of the other four criteria—continuity, compatibility, congeniality and control—have a bearing on cost-effectiveness.

OPEN World—the Five C's plus commitment.

As the international leader in digital telecommunications, the technology that ties computers and communications together, Northern Telecom is in the unique position of being able to make the OPEN World a reality.

Our technological heritage allows us to meet the five criteria conclusively, as we have always done, for example, in providing equipment for the telephone network. When you place a long distance call, it may pass through many generations of equipment, all working smoothly together. Use of the telephone is simple, although much complex technology is involved. And the relative cost of using the telephone has steadily decreased, although its capabilities are constantly expanding.

In supplying telephone equipment for over 100 years, we've met all the criteria we propose for business communications.

If you'd like a brochure describing our commitments to each of these criteria, or more information about the OPEN World, write OPEN World, Northern Telecom Inc., 259 Cumberland Bend, Nashville, TN 37228.

In the OPEN World, cost-effectiveness is the bottom line.

2. Compatibility.

Many makes and types of equipment must be able to work together as a harmonious whole. Components and systems from different manufacturers and transmission channels from different suppliers all must be compatible.

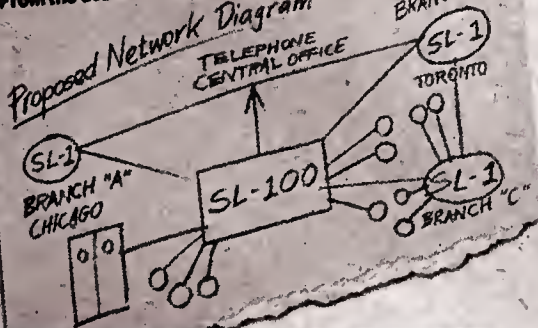
3. Congeniality.

If people find equipment or systems intimidating, unattractive, or difficult to use, they simply won't use them. Even advanced technology should be attractive and simple to use.

4. Control.

You, not a supplier, should be in control of your information

From the desk of D. Kinzie



management system. The system should

OPEN World. For information management, it's the best of all possible worlds.

nt northern telecom



'Naturally You Turn Out Work in Half the Time Now, You're Only Here Half the Time.'

SMM Release of DMS/OS Designed for IBM's XA

SACRAMENTO, Calif. — Software Module Marketing (SMM) has announced that Release 6.0 of its DMS/OS Basic System, the Direct Access Storage Device (Dasd), is now available for IBM's XA operating system. SMM also announced a selectable unit for time-sharing option/system productivity facility (TSO/SPF), said to provide a comprehensive menu-driven

interface to all DMS/OS functions.

Those functions include archiving, migration, backup, disk-to-disk conversions, idle space release and Dasd space billing.

The purchase price of Release 6.0 is \$12,000, and the TSO/SPF Selectable Unit costs \$2,500 from SMM, 1007 Seventh St., Sacramento, Calif. 95814.

On-Line, Interactive Planner

'Profitkey' Fits DEC's PDP-11

MARATHON, Fla. — Key Systems, Inc. has announced an on-line, interactive planning, scheduling and control system designed to run on Digital Equipment Corp. PDP 11/23 and 11/24 minicomputers and most microcomputers.

Called Profitkey, the modular package provides tools for master scheduling, materials requirements planning,

multilocation inventory management, capacity requirements planning, shop floor control and purchasing. Supporting financial and accounting functions are also available, a spokesman said.

A basic Profitkey package including basic inventory and material control costs \$12,000. The complete system including master scheduling, production control,

capacity planning, customer management, purchasing and financial operations, costs \$32,000 from Key Systems, P.O. Box 1319, Marathon, Fla. 33050.

Monitor Enhanced

(Continued from Page 43)

displays of device I/O queues, logical control unit and channel path statistics, maps of virtual storage above 16M bytes and displays of new MVS/XA control blocks, the vendor explained. This version reportedly provides support equivalent to the existing Omegamon and Dexan monitors, while existing MVS features that have no counterpart in MVS/XA, such as logical channel displays, have been replaced with corresponding components.

The XA version also includes additional improvements to the Automatic Exception Analysis software, a control block dumping facility, a user parameter module and authorized cross memory and virtual memory commands. Also, product installation has been simplified, the vendor added.

Omegamon/MVS and Dexan/MVS users will receive MVS/XA support at no additional cost. The complete software systems sell for \$19,500 each.

The newly devised External Monitoring Mode will enable Omegamon/IMS and/or Dexan/IMS to monitor IMS from their own address space rather than from inside the address space of the IMS control region, the vendor said.

This enhancement is available at no charge to current users running MVS/SP 1.3 and will be available as part of Version 200 of the IMS product line to be released during the second quarter of 1983. Omegamon/IMS and Dexan/IMS cost \$19,500 each.

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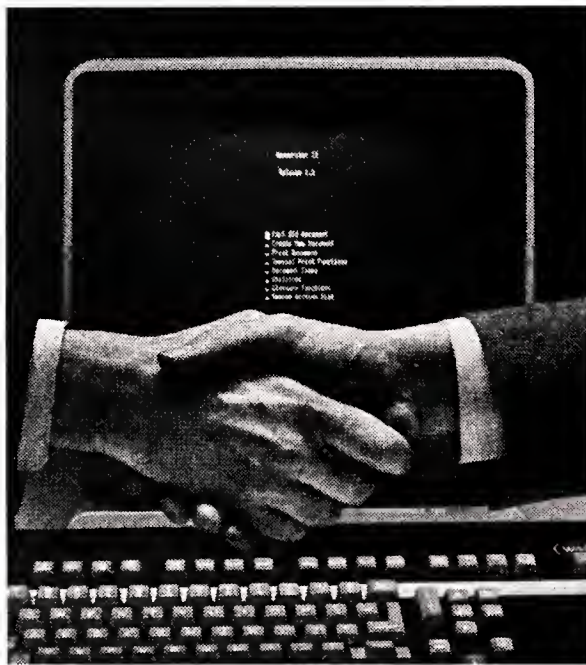
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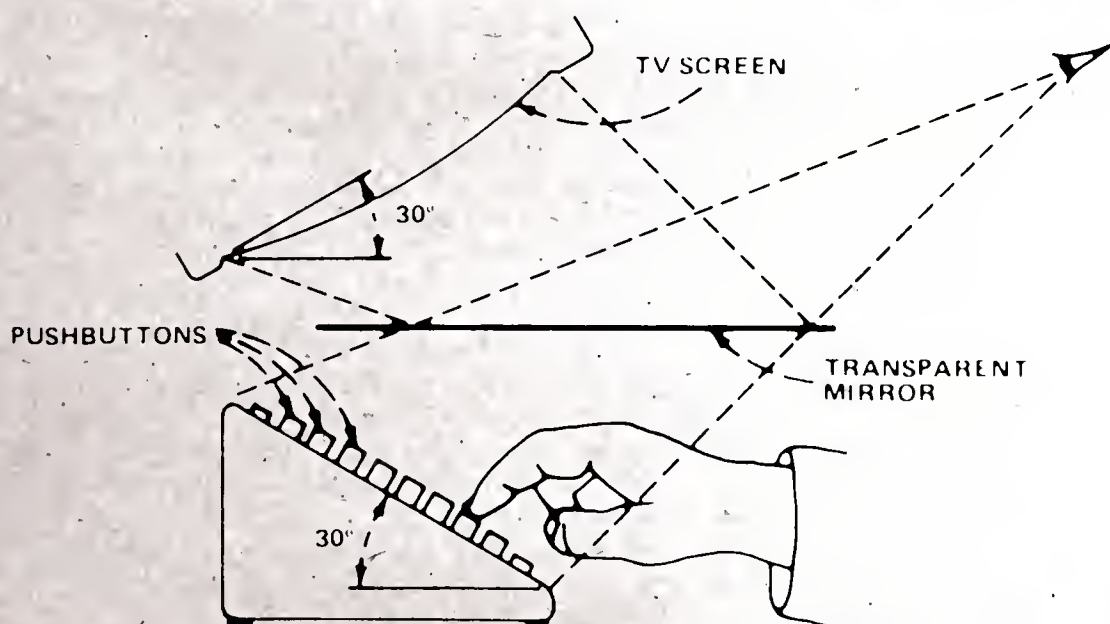
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IN DEPTH

HUMAN PERFORMANCE ENGINEERING

Looking Through The User's Eyes

By Robert W. Bailey

Many of the most critical decisions designers must make when developing a new system are related to human performance. Informed decisions require that designers understand several human performance considerations, including how users sense, process information and respond. To begin with, what is perception and how do people develop perceptual skills?

The word "perceive" is often used as a synonym for "see"; however, perception may involve any sense, including hearing, tasting, smelling or feeling. Another person's perception cannot be observed directly and is usually inferred from observations of performance.

Perception involves the interaction of two sources of information available to the perceiver. The first is the information available through our senses, and the second is the accumulated knowledge of the perceiver stored in memory. The whole process of perception hinges on being able to relate new experiences with old experiences in some meaningful way. Perceptual skill, in fact, may be defined as developing ways of quickly and efficiently combining new experiences with old.

The perceptual process as a whole seems quite flexible. For example, I. Kohler in 1964 reported a series of experiments where subjects wore special prism goggles that reversed the image on the eye, transforming the entire visual world into a mirror image. The subjects wore these prisms for several days or weeks. At the beginning, the subjects functioned clumsily and would, for example, see someone apparently on their left, move to the right and bump squarely into the person. After a while, however, the subjects adapted to this new way of looking at the world and were

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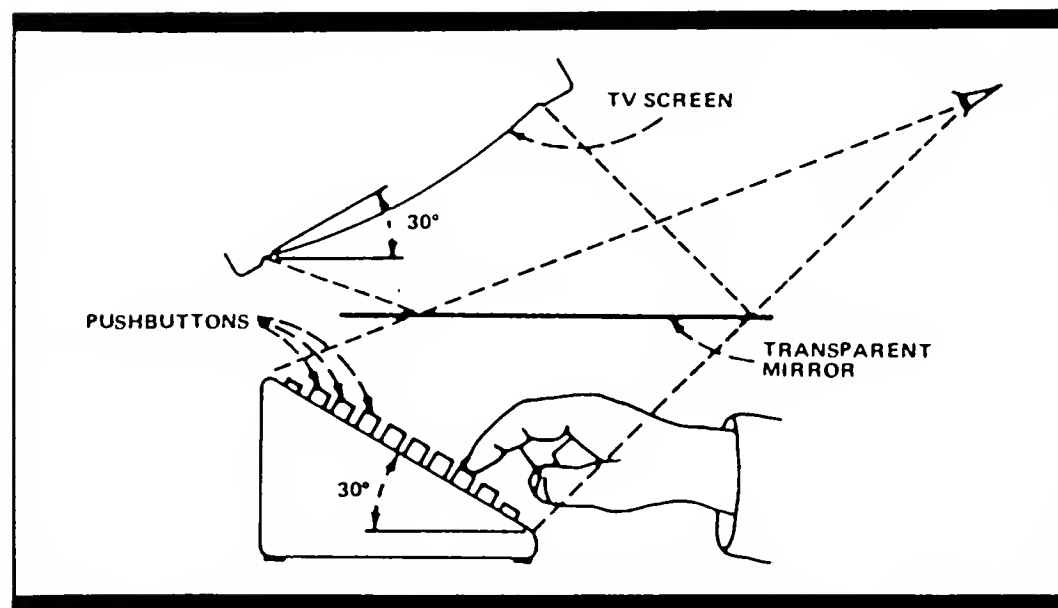


Figure 1. A Knowlton keyboard with computer-generated labels optically superimposed on an array of buttons.

able to function quite well. One subject learned to ride a bicycle with ease while wearing the prisms. Then, when the prisms were removed, subjects had to go through an adaptation period to readjust their perceptions.

In another study, people were asked to reach for a target while looking through similar prism goggles that displaced their visual world several inches to the left or right. Af-

ter watching their reaching hand for several minutes through the prisms, they were soon able to recorelate vision with touch and reestablished normal performance despite the optical distortion. When the prism goggles were removed, the people would reach for the same targets and miss in the opposite direction. Recent research by C.S. Harris has shown in these types of situations

'Perception can be thought of as having the immediate past and the remote past brought to bear on the present in such a way that the present makes sense.'

that, contrary to all appearances, visual perception does not change at all. It is kinesthetic perception that is affected.

Instead of correcting the distorted visual input, people automatically adjust their kinesthetic perceptions to match the visual input. It is the persistence of the altered kinesthetic perception that requires the readjustment period once the prism goggles are removed. This readjustment period can last for quite a long time, as shown by another study (C.S. Harris and J.R. Harris). People spent 15 minutes a day for four days drawing pictures and doodling while watching their hand through mirror-reversing prism goggles. Afterwards, when they tried to write letters and numbers correctly while blindfolded, they often wrote them backwards without being aware of their errors. It is interesting to note that only the hand that is observed through the prisms makes the kinesthetic adjustment; the other hand is unaffected by the visual distortions.

These and other similar findings have practical application in interactive computing. For example, if a visual movement is linked to a hand movement in another location (as when one uses a Rand Tablet or "mouse" to control a CRT), the arm's kinesthetic sense may become distorted. The distortion could happen without the user's awareness and could induce errors in movements made without visual guidance, such as reaching for familiar control buttons without looking.

Designers should proceed cautiously when developing systems that use spatially separated controls and displays. To help avoid these kinds of perceptual difficulties, designers should develop systems with controls and displays coincident—for example, a light pen in computer graphics or perhaps a device like the Knowlton keyboard, which works with either graphics or alphanumeric input.

The Knowlton keyboard (Figure 1) makes use of computer-generated labels that are optically superimposed on an array of keys on a standard keyboard. This arrangement permits great flexibility of labeling and other human performance advantages. But in addition, it helps to ensure that visual feedback is seen in the same location as the finger that produces it.

Matching Patterns

One of the most remarkable features of the perceptual process is the capacity to respond to a wide range of different patterns. People usually make accurate responses irre-

spective of the size of the stimuli. For example, the size of type on a page has little effect, over a considerable range, on the speed or accuracy with which the page is read. We can view the printed page, the face of a friend or any object from various distances and yet perceive it as constant in size.

The ability to recognize spoken words is even more remarkable. Within limits, a speaker can vary his rate of speech or loudness; another voice with very different frequency characteristics can even take over and the listener would continue to understand. In fact, speech is quite intelligible if all frequencies above 1,900 Hz are omitted or if all below 1,900 Hz are omitted instead.

The following example illustrates the complexities involved in recognizing patterns.

In November 1966, a 25-year-old soldier home on leave accidentally suffered carbon monoxide poisoning from leaking gas fumes.

Seven months after the accident, the soldier was admitted to a hospital for extensive tests. Most of his cognitive abilities, such as language use and memory, appeared normal. Most of his perceptual system was also intact. He could readily identify and name things through their feel, smell or sound. In addition, his most elementary visual abilities were also preserved. Nevertheless, the soldier's visual perception was severely impaired. He was unable to recognize objects, letters or people when he saw them. His impairment was so severe that on one occasion he identified his own reflection as the face of his doctor (*Cognition*, Addison-Wesley Publishing Co., 1979).

The soldier was unable to recognize shapes or forms. At one point he was given a test in which he had to select which two of several patterns were the same. The man was unable to match any of them correctly. The soldier's disorder dramatically illustrates the negative effects associated with losing even a small part of the perceptual process.

Perception is more than just sensing isolated lines or patches of color. The overall arrangement is crucial. For example, a line segment may be identified more accurately when it is part of a picture that looks like a three-dimensional object than when it is within a less meaningful context.

In proofreading, we sometimes may fail to detect errors (distortions) because the context leads us to expect a certain pattern. This is illustrated in Figure 2.

If someone reads Figure 2 quickly and is asked to point out the error, he would likely suggest that Jack and

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Jack and Jill went
up the
hill to fetch a
pail of milk

Figure 2. What's wrong?

Jill fetched a pair of *water*, not milk. This is true. However, the extent of errors in this short passage goes far beyond the substitution of milk for water. The words "went" and "a" are repeated. People frequently overlook this because we learn to ignore certain types of errors in favor of recognizing a consistent and meaningful whole.

Perception can be thought of as having the immediate past and the remote past brought to bear on the present in such a way that the present makes sense. The *skilled* perceiver

detects features and structures of which a naive viewer or listener is not even aware because he lacks past experience (or knowledge of what is task-relevant). A younger child, for example, sometimes ignores information that older children and adults recognize quite effortlessly.

U. Neisser (1976) proposed a perceptual cycle. The cycle begins with a "schema" which directs exploration and samples the environment; this in turn modifies the schema, which directs new exploration, and so on. The term is defined here as the portion of the perceptual cycle that is internal to the perceiver, modifiable by experience and somehow specific to what is being perceived. The schema accepts information from the senses and is changed by that information.

When viewed as an information acceptor, a schema is like a format in computer programming language. Formats specify that information must have certain characteristics to be interpreted coherently. Other information could be ignored or lead to meaningless (perhaps confusing) results. A schema also functions like a plan for finding out about objects

and events and for obtaining more information to meet the format requirements.

We see perception as an active, constructive process; at each moment the perceiver constructs anticipations of certain kinds of information that enable him to accept it as it becomes available. The perceptual explorations are directed by the schema. Because we perceive best what we know how to look for, it is the schema (together with the information actually available in the world) that determines what will be perceived.

Anticipatory schemas then are plans for perceptual action. These anticipations enable a person's eyes to move, head to turn, hands to explore, all to be in a better position to sample the world. The outcome of the explorations, the information picked up, modifies the original schema. Thus modified, it directs further exploration and becomes ready for more information.

Seeing, listening and feeling are all perceptual skills that develop over time. Expectations appear to direct perception. For example, the old joke that the optimist sees the dough-

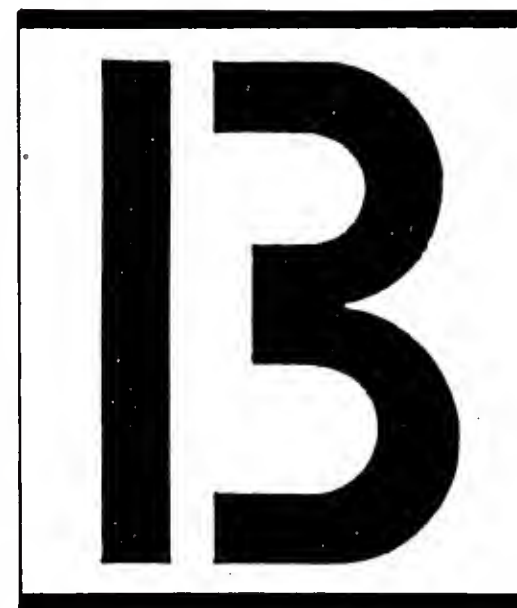
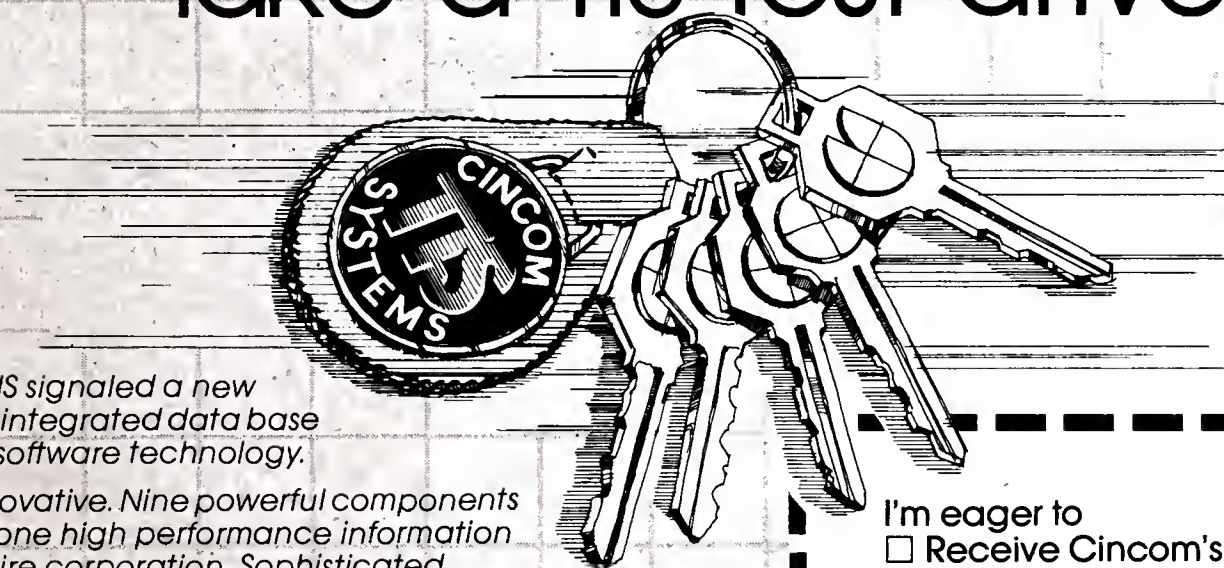


Figure 3. This figure could be perceived as a B or 13, depending on your expectations.

nut while the pessimist sees the hole does not imply that either is mistaken. Each will be confirmed by what he has seen. People can identify a picture or word far more easily when it is anticipated or plausible (that is, matches expectations) than when it is rare or out of context.

People can identify a letter better when it is part of a word than when

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IN DEPTH

it occurs in a meaningless string of letters, even when more than one letter is equally plausible at that position in the word.

J.S. Bruner and A.L. Minturn reported in *The Journal of General Psychology* (1955) a study where people were briefly shown either a letter or two numbers (for example, 16, 17, 10, 12). Afterwards they were briefly shown a broken B in which the curved part of the figure was separated from the vertical line (see Figure 3

on In Depth/3). The subjects indicated whether the broken B was a B or a 13. As expected, the subjects showed a tendency to perceive a B when expecting a letter and to perceive a 13 when expecting numbers.

To understand the message in some problems requires the development of new schema. However, once an answer is given or a rule is established and the same type of situation occurs, existing schema can be used and recognition occurs much faster.

Most people can eventually sort out, organize and arrive at a meaningful solution to each of the problems by making the necessary schema changes. By contrast, solving these problems is very difficult for computers.

Combining Sensory Input

We must not believe that people deal with each bit of sensory information that comes to the perceptual mechanism separately. People per-

ceive total situations, not isolated sensory inputs. The perceptual process puts it all together in a way that helps people understand what is occurring in the world. For example, we see someone walk and also hear their footsteps; we hear someone talk and also observe movements of the facial features. When eating, we touch, taste and smell as well as chew. When viewing an argument, we see the gestures and attitudes of the participants and hear their words and their tones of voice.

The act of perceiving is a composite of experiences, and it is this composite that is stored and becomes the schema to which new experiences are related.

Developing Perceptual Skills

In 1966, R.L. Gregory reported the experiences of a man who, blind from the age of 10 months, had his sight restored at the age of 52. When he was shown a simple lathe, he could not recognize it or see it clearly, although he knew what a lathe was and how it functioned. When he was allowed to touch it, he closed his eyes and ran his hands over the parts of the lathe. Afterwards, when he stood back and observed it, he said, "Now that I've felt it, I can see it." This man had learned a perceptual skill which allowed him to see the world better by touch than by sight. Without knowing what to look for, or how to look for it, he could not perceive the object when he first saw it. Even the simplest perceptual skills must be learned.

Each time we reread a good book we inevitably gain new insights and new information. Each reading of a good book provides new information not because the words have changed but because the reader has changed. The schema used for the second reading is much different from the schema used in the first reading. Our understanding of the world builds line upon line and precept upon precept.

Assume that we are interested in teaching people to use a CRT display. In the language of cognition, one of the designer's tasks is to create a set of experiences that will enable each user to build schema consistent with the quick and accurate use of the CRT display. One way to approach this problem is to give each person free access to a CRT display, as well as whatever time is necessary to become proficient (this may take some users days, others months). A second approach, and one that is usually more efficient, is to develop a means of assisting the person in developing appropriate schema.

Training has the advantage of guiding a potential user through the important conditions of an activity, building schema as the user has each new experience. Leaving a person to explore a new CRT display in some unstructured trial-and-error manner could be a very inefficient way of constructing new schema.

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Figure 4. How many "f's" in this sentence?

to select users who already have a particular set of desirable schema. The schema-related requirements of an activity are usually clearly outlined in a statement of minimum qualifications in the selection criteria. These requirements could include a knowledge of keyboard operation, a general knowledge of the activity to be performed and perhaps other specific capabilities. A period of formal training will then follow with the express intent of building,

in some systematic way, the existing schema related to performance with the new CRT display.

Illusions and Errors

Although people are usually quite good in judging shape, size and distance, we may be fooled by illusions. Illusions are the result of errors in the perceptual process. Illusions may be produced when we make assumptions about "how things usually are" (that is, we rely too heavily on inappropriate schema), which causes us to distort or misunderstand the information we actually receive. Many automobile, airplane and other accidents are no doubt contributed to by illusions.

An interesting illusion, closely related to the real-world activity of proofreading, is the one shown in Figure 4. Look at the figure and as quickly as possible count the number of "f's."

People usually respond by saying there are three "f's." In actuality, there are six. The difference probably occurs because the perceptual process, in an effort to make the statement meaningful, is unable to ignore the sound of the words. It overlooks those "f's" that sound like "v's," the ones in the "of's."

There are certain types of perceptual errors that commonly occur in processing information that may be related to illusions. This type of error is particularly easy to identify in computer systems where people are dealing with letters and numbers. If, for example, a person looks at a "5" and writes down a "S," or looks at a "2" and writes down a "Z," or hears an "h" and keys an "a," we would say that he has been fooled into misreading or mishearing the correct character.

A designer's primary objectives in making decisions that will ensure the adequate operation of the perceptual process should be to ensure that perceptions are accurate and to provide means for building perceptual skills. The latter objective is obviously related to providing training and other experiences to assist a person in building the necessary schema. Keep in mind that accurate perceptions are most likely when a person encounters data, information or conditions that are familiar and consistent with past experiences.‡

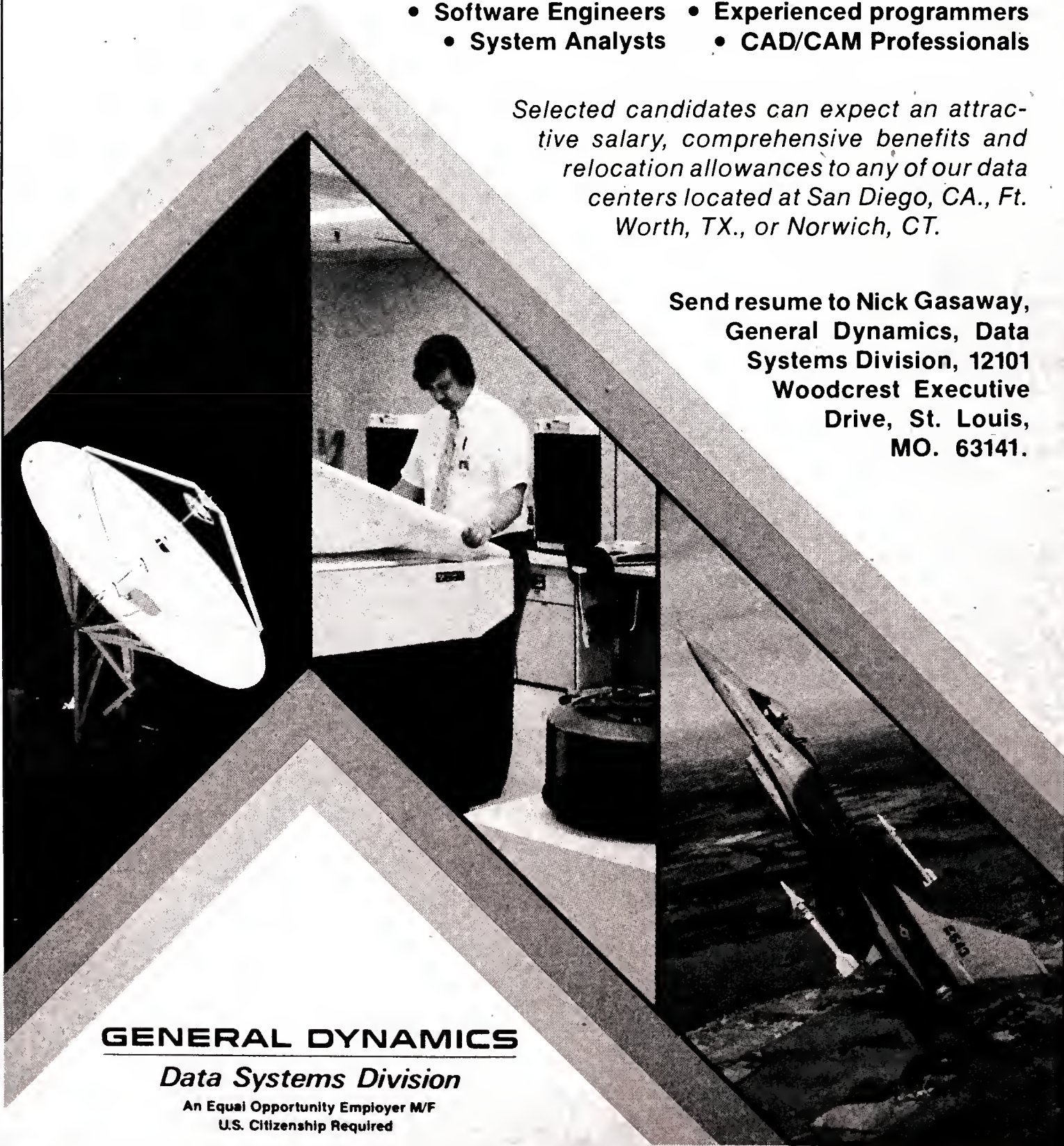
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By Paul Harmon

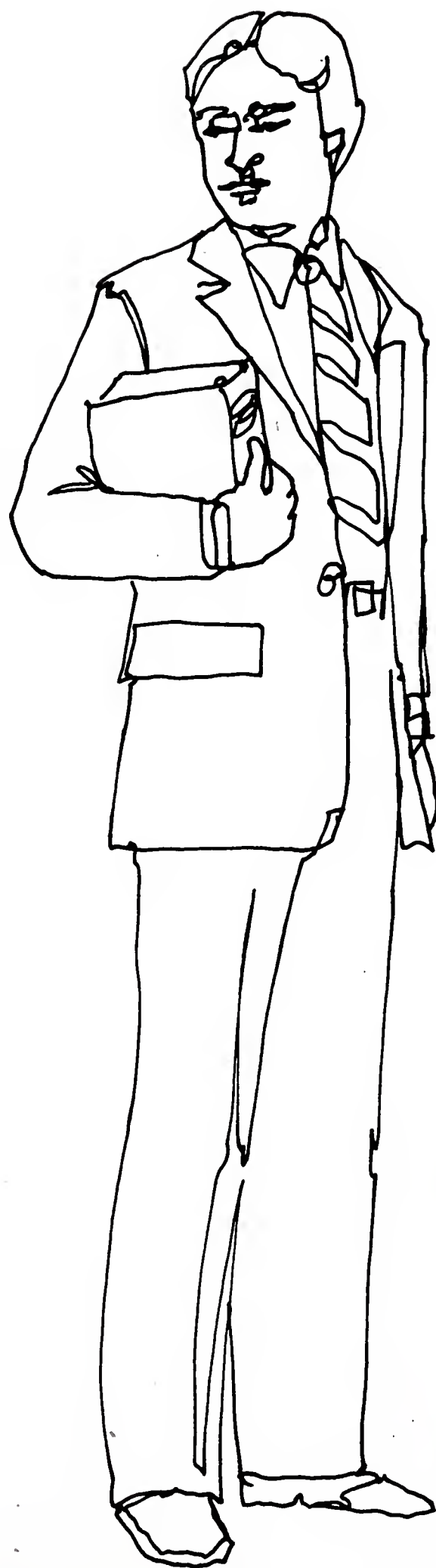
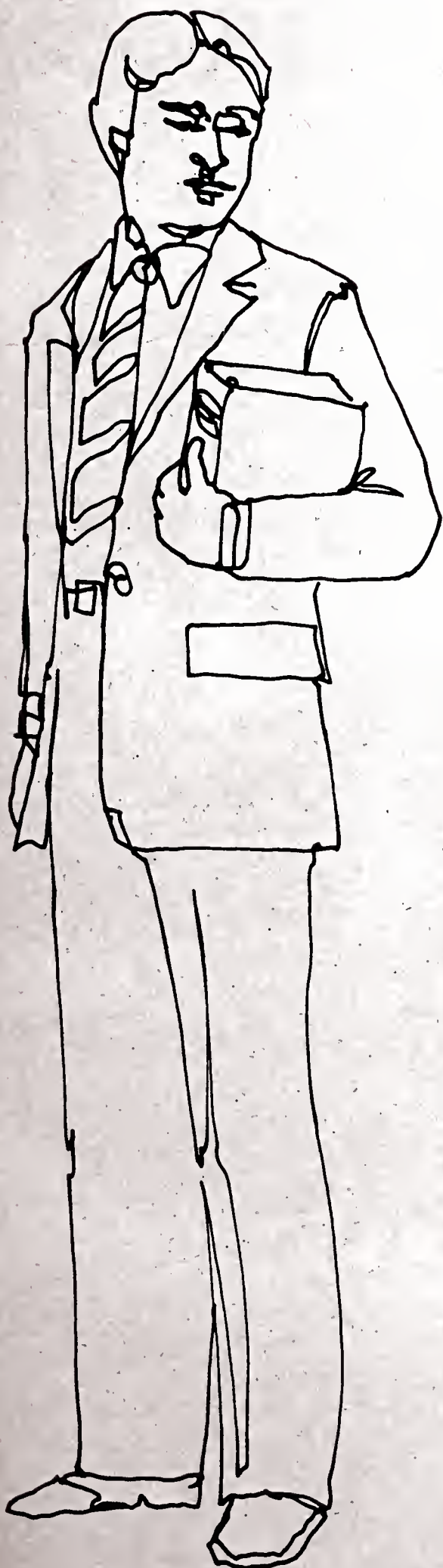
There are as many approaches to computer user training as there are computer products. The best training invariably applies well-established principles from the psychology of learning and the technology of instructional design.

Unfortunately, even many good training packages are the work of an "inspired amateur" who develops an excellent solution for one instructional problem. Unable to clearly analyze why the training program worked, however, he then seeks to apply the same approach to a new problem that cannot be solved the same way. Analogous situations occur in systems programming where some programmers solve specific problems well but seem unable to solve different types of problems.

An analysis of computer user training needs should focus on trainee capabilities and the nature of the job to be performed. This overview should help designers identify which training components are likely to generalize from one situation to another and which probably will not.

Potential users run the gamut from the completely naive to the highly sophisticated. This continuum can be segmented into three rough subdivisions: (1) those currently unfamiliar with computers, (2) those who currently use computers as tools to perform specific tasks but are unaware of "how the computer works" and (3) those who program, perform systems analyses or otherwise understand how computer systems work.

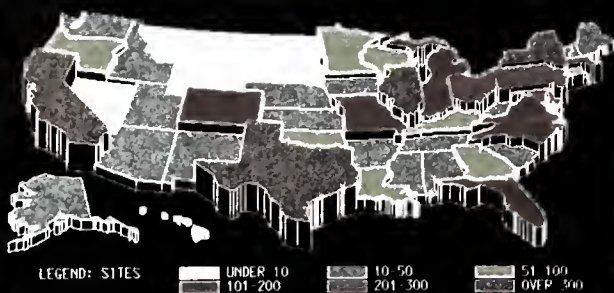
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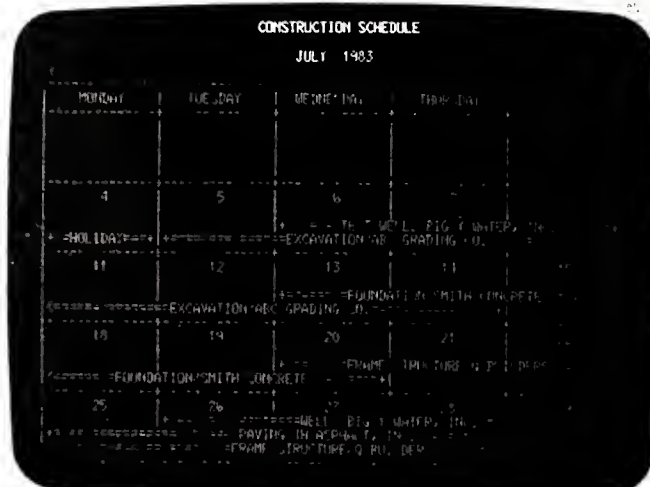
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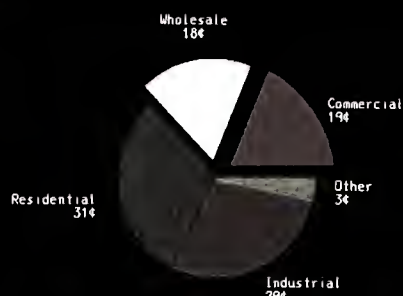
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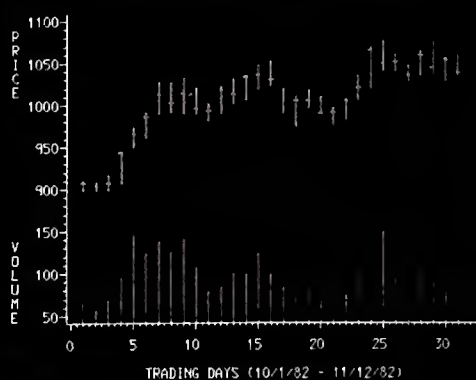
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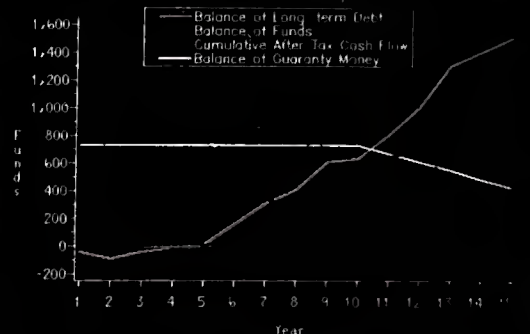


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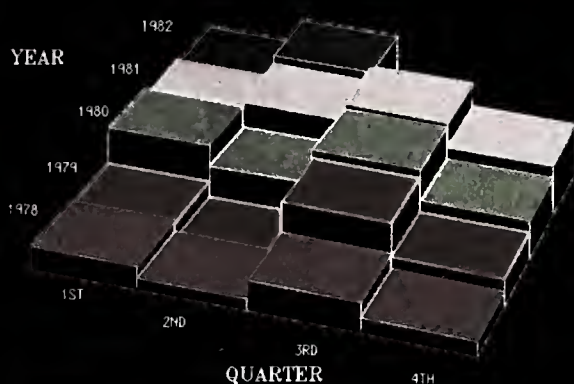
ITEM	1982	1981	1980
SALES	1,423,100	1,312,000	1,210,000
EXPENSES	(1,000,000)	(950,000)	(900,000)
OPERATING INCOME	423,100	362,000	310,000
EXPENSES	(100,000)	(90,000)	(80,000)
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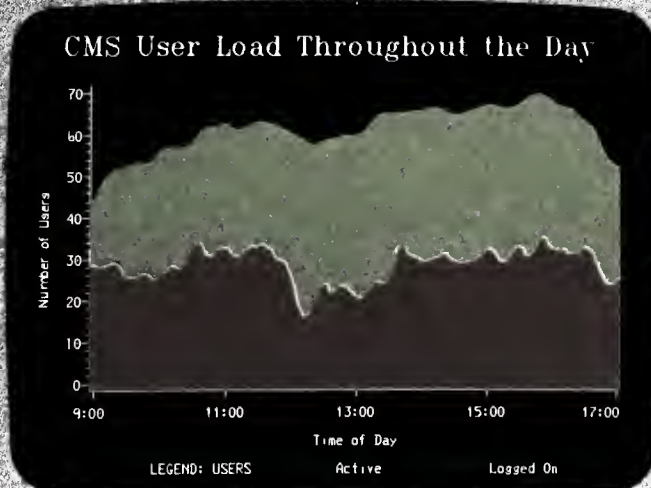
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IN DEPTH

three potential audiences, it is useful to analyze them as a developmental psychologist might. Jean Piaget and others have developed a scheme to classify the stages through which children progress. Between the ages of about 11 to 15 years, children conceptualize the world by means of "concrete operational thought." Somewhere during this period they make a transition to "formal operational thought."

Recent data suggests that while

most individuals make the transition from concrete to formal operations somewhere in the sixth through ninth grades, they only make this switch in the subjects they experience in school. In other words, most adults tend to function at the concrete operational level when they encounter tasks with which they are unfamiliar.

Consider learning to drive in a new city. Most of us begin by establishing a main route that gets us to

the specific place we want to go. Later, we learn specific paths that lead from that location to other specific destinations. We usually depend on concrete cues like billboards and buildings to alert us to make turns. In effect, we are learning to get around in the city by means of concrete learning techniques (as a rat learns to run a maze to obtain food).

Later, if we continue to visit the city, we study a map and experiment with alternate routes until we devel-

op a "grid model" of the city. We learn how the major streets relate to each other and are then able to say: "If I'm south of Market Street and I want to get to the Golden Gate Bridge, I can go north to Market, then follow Market west to Van Ness." In other words, we develop an abstract conceptual map of the city (generally formed by compass directions and major streets) that allows us to pinpoint any concrete location within our formal, cognitive map of the city.

Developmental research provides us with some interesting insights into how naive computer users are likely to think about their first interactions with a computer system. They will approach the computer as a concrete learner will approach any new and complex mechanism: they will seek to learn how to use the mechanism without trying to understand which abstract principles determine which fundamental elements and functions and which permutations determine how the mechanism must operate. This distinction between concrete and formal learning says much about what can be expected from trainees.

Advanced concrete learners can use imagery skillfully as well as all those aspects of language and symbolization that are referential. An individual capable of concrete operational thought can think and plan effectively about the properties and relationships of things he sees and touches or has seen and touched.

Most adults function more or less at the level of advanced concrete operations as they live their daily lives. We interact with the specific environment in which we find ourselves in ways that have a long history of success. Ultimately, however, concrete learners are best defined by what they cannot do — formal operations. This distinction has been demonstrated in numerous Piagetian experiments, and it can be rather generally summarized as follows:

• *Formal learners control variables in an experiment in order to isolate a cause.*

Several developmental experiments require subjects to demonstrate and explain how to control variables in a problem situation so as to determine which of two or more variables is the cause of a particular phenomenon. Concrete learners don't do this effectively; formal learners do.

• *Formal learners can identify and abstract a pattern and use their knowledge of that pattern to be systematic in solving some problem.*

In other developmental experiments, subjects are asked to predict which combinations of some set of units will result in a particular phenomenon. The students are successful if they recognize an abstract, symbolic or mathematical pattern that allows the prediction of all possible outcomes. This recognition is demonstrated when the student works systematically through all the

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2-Speed Smooth Scroll	Yes	No	No	No	No
Graphics Characters	Yes	Yes	No	No	No
Configurable Print & Send	Yes	Yes	No	No	No
Set Up Mode	Yes	Yes	No	No	Yes
Settable Tabs	Yes	Yes	No	No	Yes
Choose Protected Attribute	Yes	Yes	No	No	No
Screen Saver	Yes	No	No	No	Yes
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IN DEPTH

presentations and is able to assure the experimenter that all possible variations have been examined and that the results must be complete.

Consider the task of discovering how to predict the actions of a balance beam scale. The student is asked to experiment and find out when and why the beam will balance. The two variables are weight and distance, each measured on ratio scales.

The concrete learner will begin testing different combinations of weight and length in no particular order. As the beam balances or tips, the subject's explanation will include attention to one variable or the other — but not to the systematic interaction of both.

The formal learner may begin to experiment casually but will eventually adopt a systematic method. The specific approach the student adapts isn't important. If he uses a strategy that includes both control and systematic variation of all relevant components, the student is demonstrating formal thought. Ultimately, the formal learner will explain the balance problem by comparing the relationship between weight and length on one side of the balance with the weight-length relationship on the other side.

Concrete learners begin with observational data and then try to imagine other specific possibilities. Formal learners recognize that a particular occurrence is only one example of some class of similar occurrences, and they use what they know or can determine about the class in general to predict a number of different possible occurrences.

Another way of conceptualizing the distinction between concrete and formal thought is to imagine a driver in a car passing another car on a curving road (see Figure 1). Assume that when the driver pulls out to pass, he expects to be safely back on the right side of the road by point A. If that occurs, then the decision will have been a safe one, for even if an oncoming car rounds the bend just as passing begins, the pass will have been completed before the oncoming

car could reach point A. If, on the other hand, even with skill and the maximum possible acceleration, the driver of the passing car fails to regain the right lane before point B, then the possibility of a collision will have occurred. In this second case, if a car had rounded the turn when the passing car was parallel to the car being passed, a head-on collision would probably have occurred.

Now assume that the driver of the passing car was a teenager who man-

aged to regain the right lane by point B without encountering any oncoming traffic. What conclusion might he draw about his decision to pass? If the teenager were a concrete thinker, he would probably decide that the decision was correct. The concrete evidence of a successful pass would seem to prove that it could be done. If the driver were a formal thinker, however, he would realize that the pass was a potential failure. Such a driver might think: "I thought if I ac-

celerated fast I could get back in by A, but, in fact, I could not. I guess I'm lucky there was no oncoming traffic. I won't make a mistake like that again."

This example suggests why there can be a burst of learning following one transition from concrete to formal thought. The concrete student only learns one thing from the experience of passing. The formal learner will consider several alternate possible outcomes and, thus, can learn

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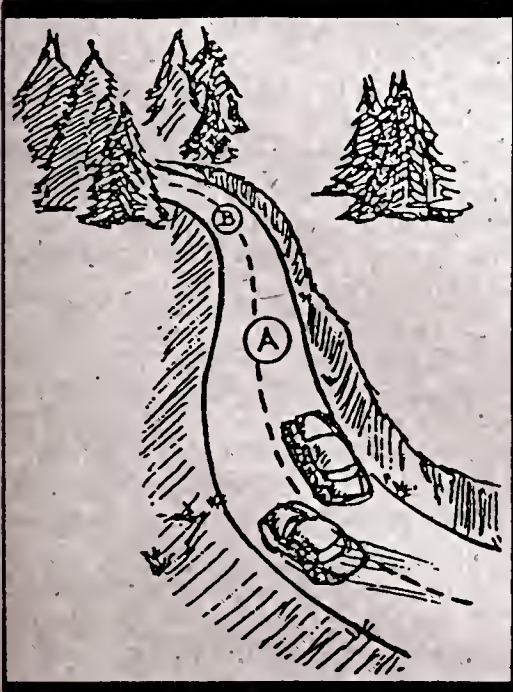


Figure 1. Passing on Curving Road

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many different lessons from the same experience. Figure 2 (on In Depth/13) summarizes some of the instructional implications of the difference between concrete and formal learners.

Developmental psychologists have collected most of their data from children and adolescents and constructed their theories to explain how children develop into adults. Issues of life-span or adult development have emerged only recently.

Thus, for most developmentalists, formal operational thought has remained a catchall term for all cognitive abilities beyond adolescence. Several current research programs seek to divide adult functioning into subcategories. Some cognitive psychologists, for example, discriminate between cognitive activity that resembles formal operational thought and what they refer to as "meta-cognitive" operations. Meta-cognitive operations refer to operations in

which the learner monitors, evaluates and ultimately directs his own learning.

I prefer to use the term meta-formal operations to describe not only meta-cognitive operations but also those operations in which the learner takes a "third perspective" and compares and simultaneously manipulates two formal systems.

For example, a formal operator may know how to program in Cobol or he may know how to create a gen-

eral accounting system. When he starts trying to program a computer system to do general accounting, however, he may simultaneously manipulate the variables involved in both Cobol programming and in accounting. I refer to this cognitive effort to integrate two independent formal systems as meta-formal thought. The effort involves thinking through the emergent interactions that will occur if two otherwise conceptually independent systems are to be integrated.

Returning to our subdivision of computer user trainees, I suggest that those unfamiliar with computers must be regarded as concrete thinkers — at least, relative to computer systems. Those who use computers as tools include some concrete thinkers and some formal thinkers. Those who program are clearly formal thinkers, if not meta-formal thinkers. And those who do systems analysis must be regarded as meta-formal thinkers.

Nature of Computer Tasks

As with trainee capability, task complexity can vary greatly. We can conceptualize task complexity as a continuum that ranges from very simple tasks like using a pocket calculator for addition to complex tasks like learning to program or troubleshooting a very complex operational system. Again, it is useful to segment the continuum into three fuzzy subdivisions: 1) tasks that only require the user to follow a well-defined, step-by-step procedure; 2) tasks that require the user to do a limited amount of problem-solving; and 3) tasks that involve analyzing a situation and then programming the system to manipulate data about the situation to achieve some goal.

It is easy to think of the three task subdivisions just described in Piagetian terms. Tasks that are well-defined and simply involve following a step-by-step procedure can be thought of as concrete tasks.

Learning to operate a bank's automatic teller machine to obtain cash is an example of such a task. Likewise, tasks that require limited problem solving tend to be formal operational tasks simply because they force the problem-solver to relate two frames of reference — what the environmental situation seems to demand and what the computer system is capable of doing. To the degree that the system was designed to reflect the environmental situation, the task is more concrete.

On the other hand, to the degree that the performer must analyze the environmental situation in one set of terms and then translate those terms into another set of terms to conceptualize the problem for computer manipulation, the task is rendered formal or even meta-formal. A biologist, for example, who analyzes a wildlife community, using the traditional vocabulary and models of an ecologist, and then turns to a computer



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IN DEPTH

equipped with an ordinary statistical package to analyze that data, is clearly involved in a formal or perhaps meta-formal task.

Tasks that require systems analysis and design tend to require that the performer analyze one system and then translate that analysis into terms appropriate for a second system. Such tasks are almost always meta-formal. The situation is similar to the example of the biologist just given, except that in this case the systems analyst frequently has to devise the vocabulary to use in analyzing the environmental system and then must understand the abstract capabilities of the computer well enough to develop a program capable of manipulating the information derived from the environmental system in an appropriate manner.

Another way that instructional designers are beginning to talk about tasks is derived from recent work in artificial intelligence. Tasks are "heuristic-based" if the procedures cannot be precisely defined but can be described by sets of "rules of thumb" used by experts in particular situations. Formal tasks tend to involve the use of a well-defined set of heuristics, and meta-formal tasks tend to involve the use of heuristics drawn from a number of different fields or perspectives.

An Instructional Space

By crossing the audience continuum with the task continuum, we obtain a matrix that provides a good overview of the possible packages of computer user training. Our model defines nine generic types of computer user training. Beginning with this model, we can consider what research in learning theory and instructional design can tell us about how to handle each of the nine generic training problems.

We will not consider the specific tasks or the specific environments in

which we might have to implement a solution. Thus, we cannot identify the specific instructional designs or the media we might use to implement them. We can, however, identify the general nature of the instructional design that will provide the most effective overall approach to each of the nine general training situations.

In order to specify overall approaches, however, we must first discuss four general characteristics of any instructional design. Each characteristic reflects a general design decision that will have major implications for any specific design we later decide to develop.

To hire or train? Training is expensive. Early in the analysis of a training problem the instructional designer should sort through the list of things a user will need to know in order to perform a particular task and put a ballpark price on the cost of developing the training, the time it will take to get the training developed and implemented and which portions of the information to be learned are already possessed by other employees or appropriately qualified new hires. It is often better to hire the skills you need instead of trying to develop them internally via training. It does not make sense, for example, for a company to hire naive new employees and then train them to program in Cobol. It is much more cost-effective to hire individuals who learned Cobol programming in school.

On the other hand, if your company produces and sells a computer product, you probably have the problem of developing training for your customers' employees. You may have to try to take on all types of users or you may be able to specify that trainees have certain prerequisites before they attempt to use your training package.

What is the nature of the information (meaning) to be communicated? Some information is essentially conceptual or structural. Such information is concerned with definitions, with similarities and dissimilarities between entities or concepts and with analytic tools one can use to classify and manipulate such symbolic things. Understanding involves mastering appropriate conceptual distinctions, making transformations permitted by the internal logic of the structural system and

achieving consistent results.

Learning to program in Cobol or learning calculus are essentially conceptual or structural tasks. Teaching a user that a new accounting system has three major components is a simpler but equally important example of conceptual or structural information.

Other information is essentially procedural. Procedural information provides the user with an overview of the sequence of steps to be

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	Cannot use explanations that involve two or more independent variables or that depend on the control of one variable while another is being examined.	Can use explanations that involve two or more independent variables and/or that depend on control of variables as part of the analysis.
	Cannot expect student to generate hypotheses or think in terms of abstract patterns.	Can expect the student to generate hypotheses and to think in terms of abstract patterns.
	Cannot expect student to be aware of his own reasoning, inconsistencies among various statements he makes or contradictions with other known facts.	Student is aware and critical of his own reasoning and actively seeks checks on the validity of conclusions by appealing to other known information.
	Needs reference to familiar objects, actions and observable properties.	Can reason with concepts, relationships, abstract properties, axioms and theories; can use symbols to express ideas.
Constructing Exercises	Don't build exercises that require the trainee to control variables while experimenting.	Use exercises that allow the trainee to learn from experimentation.
	Give step-by-step instructions for complex procedures, should use successive approximations and emphasize practice.	Emphasize theory and/or overview.

Figure 2. Comparison of Concrete and Formal Operations

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performed. In this case, the learner must learn a sequence and execute it often enough so that he can perform the procedure as quickly and effectively as necessary.

Typically a training program and the accompanying documentation must contain both kinds of information, but deciding when, where and how much of each kind of information to use is a critical design consideration.

How will the performer need to

store the information? When a training analyst examines a new training problem, one of his first concerns involves a choice between either an instructional strategy that relies primarily on memorization or a strategy that relies on job aids. He must think about what the trainees will need to do on the job.

A memorized response implies on-the-job recall and action without any intermediate process. A response guided by a job aid, on the other

hand, implies the use of some device that helps the individual make the correct response. A cook uses a job aid when he uses a cookbook to determine exactly what quantities a particular recipe will require. The income tax forms we use to report our taxes are job aids as is the pocket calculator we use to solve arithmetic problems.

Memorized responses allow a person to respond quickly. They also allow the person to "turn a problem

over in one's head" and to continue to ponder it while he sleeps. A person taught to use a job aid, on the other hand, will be slower to respond, but will generally respond with more accuracy. In addition, a person with a well-constructed job aid can respond to a much wider range of situations than a person who must retain all pertinent responses in his memory.

Whenever the task to be performed is very complex, a job aid strategy is the preferred instructional approach. Equally important, if we want to train someone to perform a job that is subject to frequent procedural changes, such as code or rate changes, the cost of changing a job aid is much cheaper and more easily and effectively accomplished than the effort and cost involved in re-training an employee's memory.

How will each of the three parts of an ideal module be realized? The key to designing effective instructional modules is to focus on the exact behavior you expect the trainee to be able to demonstrate when he completes the module. A lot of thought at this point about the specific test items that will demonstrate student mastery will save considerable time later on. A test item should, as nearly as possible, call for the same behavior that you will want the trainee to perform on the job.

Part 1: Overview. The overview portion of an instructional module sets the context for instruction. When complex conceptual or structural information must be taught, the overview is generally subdivided into a short, general overview and a more elaborate section on theory. The overview should:

- Relate this module to other modules, as appropriate.
- Tell the student when and where he might use the information to be presented in this module.
- Assure the student he will be able to make the appropriate responses.
- Indicate the consequences of correct and incorrect responses.
- Describe the mechanics of the rest of the module.

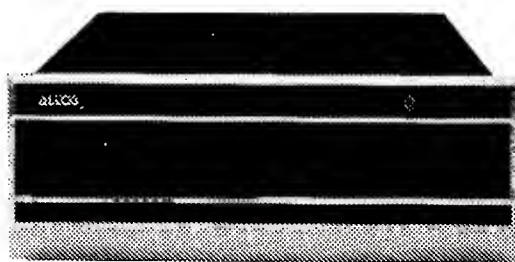
If needed, the theory portion of the module should contain all of the information necessary to ensure that when the student examines a particular situation, he will perceive the appropriate stimuli and know whatever information he will need to know in order to proceed. If the instructional problem is very straightforward, the only theory required may be a description of a sequential performance. If the instructional problem involves teaching conceptual or structural information, the designer must develop that information into a set of discriminations and interrelationships that the learner can comprehend and master.

If job aids are to be used, determine when they will be introduced and how they will be used. As a rule, job aids are initially introduced in

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'Problem solving typically requires the user to shift focus constantly. You must provide enough examples and practice problems to guarantee that the trainees will be able to generalize from the problems they encounter during training to that larger class of problems they will meet on the job.'

the theory portion of a module.

Part 2: Practice. Once trainees have been provided with the necessary overview and general theory, they should be asked to apply their knowledge to specific examples. Your analysis of the task and your test items should indicate what practice problems to set for the trainees. As a rule, practice is subdivided into a demonstration, prompted exercises and test items.

Following the demonstration, the trainee should be asked to perform. As many hints or progress checks as seem necessary should be provided to assure that the student succeeds in the performance. When in doubt, minimize the prompted exercises and test to see if minimal hints will lead to successful performance. If they do, you avoid writing overly long and potentially boring exercises. If they don't, you can systematically increase the number of prompted exercises, sequencing the exercises so they become gradually more difficult.

The final exercise the trainee undertakes should require that he do exactly what will be expected when he completes the instructional module.

Part 3: Application. Finally, consider if you can obtain instructional components or job aids that will ease the transition from the training situation to the actual job. For example, each trainee might leave the training session with a checklist that the trainee and his supervisor might complete when the trainee reports to the job. Often, this sort of transitional instruction becomes a matter of providing some supervisory training. Whenever possible, postinstructional support should be considered as a means of helping the student make an easy transition to the job.

Nine Approaches to Instruction

Having considered these four general characteristics of instructional design, we can now examine the nine cells of the matrix to see what kind of general design will be most appropriate for each type of user-task interaction.

The matrix, with a summary of the nine instructional possibilities, is presented in Figure 3. Next we will briefly examine the instructional approach that is likely to be most effective in each case.

1. *Training unfamiliar users to perform algorithmic procedures.* The instructional design indicated here is straightforward. We assume that the

user is a concrete thinker, at least as far as computers are concerned. Thus, we must be very specific in pointing out the steps in the task. Luckily, the task is algorithmic and there is rarely a need for the user to memorize information, so good job aids can be developed. The job aids can range from menus presented on a CRT screen to plastic cards or even a small reference booklet the user can occasionally consult while working through the task. Be sure to provide enough drill in the procedure to assure that the new user will trust the job aid and be confident of his basic skills before turning him loose on the job.

2. *Training unfamiliar users to perform tasks that require problem solving.* In this case, a concrete operator must be taught to use a computer to perform formal operations. If the user already understands how to conceptualize the formal subject matter, this is not too difficult. If the trainee is an accountant, for example, and must be taught to use a CRT to enter and obtain cost projections, you have a reasonable training task. If, on the other hand, you have a new hire who understands neither computers nor the subject matter of the problem environment, you face a major training problem. In such a situation, you should consider hiring someone who already possesses some of the necessary skills (either accounting or computer skills). In other words, if possible, you should shift some of the training burden to outside institutions by relying on hiring rather than training.

If you elect to train, you will need to provide the student with a concrete overview of both the problem and the computer procedures to be used. If it is an accounting situation, you will want to walk the trainee through two or three case studies that demonstrate exactly how the problem is analyzed, set up and processed. You will want to develop job aids to minimize the memorization required of the student.

The key problem to overcome in order to make this instructional effort successful is generalization. Problem solving typically requires the user to shift focus constantly as the exact nature of the problem shifts from one situation to the next. At the same time, different problems imply different uses of the system. You must provide enough examples and practice problems to guarantee that the trainees will be able to generalize from the problems they encounter

		TASKS TO BE PERFORMED			
		Formal		Meta-Formal	
		Concrete			Meta-Formal
		Algorithmic		Heuristic	
		Tasks involving a well-defined step-by-step procedure.		Tasks that require programming or systems analysis.	
USER BACKGROUND & SKILLS	Concrete	1. Users unfamiliar with computers. • Concrete overview of procedure. • Example(s) of procedure in use. • Drill in procedure.	2. Tasks that require problem solving. • Overview of problem and procedure. • Drill in analyzing problem and in following procedure. • Job aids (considering hiring).	3. Tasks that require programming or systems analysis. • Don't train; hire someone with all or most needed skills.	
	Formal	4. Users use computer as a tool. • Overview of procedure. • Example(s) of procedure in use. • Drill in procedure. • Job aid.	5. Tasks that require problem solving. • Overview of problem and procedure. • Drill in analyzing problems and in following procedure. • Case studies. • Job aids.	6. Tasks that require programming or systems analysis. • Don't train; hire someone with all or most needed skills.	
	Meta-Formal	7. Users are programmers or systems analysts. • Minimal overview. • Good example of procedure in use. • Job aid.	8. Tasks that require problem solving. • Overview of problem & procedure. • Good example of analyzing problem and following procedure. • Job aids.	9. Tasks that require programming or systems analysis. • Structural overview (analogy between structure/procedure and new structure/procedure). • Case study for review. • Conceptual job aids.	

Figure 3. Design Possibilities in Computer User Training

during training to that larger class of problems they will encounter on the job.

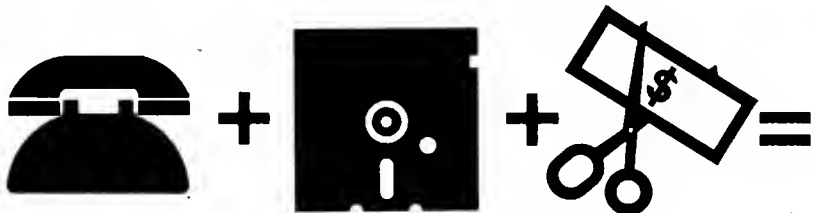
3. *Training unfamiliar users to perform tasks that require systems analysis and programming.* It is not practical for a company to try to teach a concrete thinker to perform meta-formal operations. Individuals who want to learn to program should go to a special school or to college. Companies should hire individuals who already possess these basic skills to perform such complex tasks.


4. *Training a user who knows how to use a computer to perform algorithmic procedures.* The instructional approach should provide a clear overview of the procedure as well as drill in the procedure. A job aid should be

developed that outlines the procedure and, thus, minimizes any memorization requirements. Clarity and simplicity are the keys to good instruction in this area.

5. *Training a user who knows how to use a computer to perform tasks that require problem solving.* In effect, we are faced with teaching someone who already uses a computer as a tool to use it in some new way. We may, of course, be asking the user to learn to use a new terminal or other unfamiliar computer hardware. We are also asking the user to learn to use the computer for some new procedure.

An appropriate instructional module will begin by explaining the problem to be analyzed and the overall procedure for solving it. In most





PERSONAL COMMUNICATIONS

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cases, a job aid should be provided to help the user analyze the problem and remember the steps in the computer procedure.

Following the overview, the user should be provided with several practice problems and asked to use the job aid and the computer to solve them. In at least the first practice problem, a step-by-step solution should be provided to allow the trainees to review their work. In all cases, correct answers should be

available. Depending upon the complexity of the problem or the computer procedure, these practice problems may look like case studies.

6. *Training a user who knows how to use a computer to perform tasks that involve programming or systems analysis.* In the worst case, this instructional situation might require teaching a formal operator who had been using a computer to assist in some trivial task to learn a programming language or some systems analysis. In

general, this is not practical. It would make more sense to hire someone who already had the skills or to send an employee to a college or specialized program to learn them.

In the best case, you would be seeking to teach a very skilled individual to use some specific set of programming or systems analysis skills. In the better case, a short, intensive outside or internal program (in effect, a lengthy overview and theory of the subject) followed by an on-the-

job training program in which the individual worked directly with someone who was already performing the task would probably be the most cost-effective solution.

A lot depends on how much the user already knows and how complex the programming task is. It is hard to get a formal thinker to become meta-formal in a short time; experience seems to play a major role in the process, and training can only do so much to shorten the time required to develop an experienced performer. In the near future, artificial intelligence offers the possibility that "expert systems" programs can serve as sophisticated job aids for trainees.

7. *Training programmers or systems analysts to perform tasks involving algorithmic procedures.* This is obviously a trivial training problem. The essence of an effective solution is not to allow the training to get in the way of the learner. Even a programmer, of course, needs to know why he might want to learn some new procedure, so a minimal overview is required. The ideal overview will be very specific in relating the procedure to the user's needs. In addition, a job aid that outlines the step-by-step procedure should be provided.

8. *Training programmers or systems analysts to perform tasks that require problem solving.* This instructional problem will vary depending upon the complexity of the problem-solving situation to be taught. In all cases, a clear overview of the problem and the procedure, a good job aid and two or three examples should be included to demonstrate the procedure. In complex cases, exercises should also be provided.

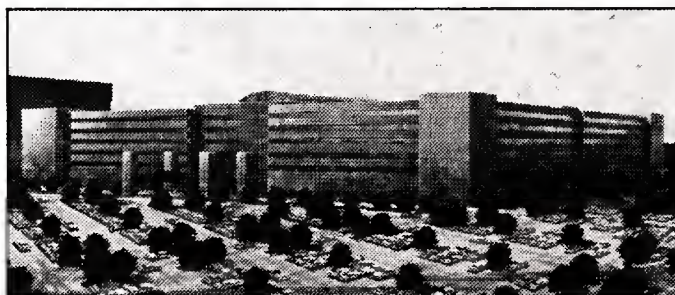
9. *Training programmers or systems analysts to perform tasks that involve programming or systems analysis.* This task varies in complexity depending on the match between what the user already knows and what he will learn. If the match is considerable — if one is teaching a Cobol programmer to use Basic — the training task is minimal. If, on the other hand, one is to teach a Cobol programmer to use Lisp, the task can be quite complex. In all cases, the key is a good conceptual overview that clearly lays out the analogy between a known structure and/or procedure and the new structure and/or procedure.

Conceptual job aids that will remind the user of the critical similarities and dissimilarities between the two systems can be very useful. Practice problems should be included and ideally should relate work the users are already doing to work they will do once they have mastered the new system. In this area, too, expert systems programs will probably soon emerge as the ideal job aid.

About the Author

Paul Harmon is president of Harmon Associates, a San Francisco-based consulting company that analyzes performance problems and develops training systems for computer users.

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Designing for Today is Too Late Meet Tomorrow's Net Needs, Urges VP

By Jim Bartimo
CW Staff

TARPON SPRINGS, Fla. — Developing a communications network for today's needs is useless. A company must install a system that answers tomorrow's needs, because the network will be at least two years in implementation, according to Harvey Hershkowitz, vice-president at Chase Manhattan Bank.

Hershkowitz — who has developed local-area networks, an intersystem communications strategy and a national data network for Chase — gave some tips on successful network implementation at International Data Corp.'s 14th Spring Executive Conference held here recently.

The first item on the agenda is a strategic plan. "Don't spend most of your time talking with systems people," Hershkowitz said. "They don't know

where the company is going, they're worried about solving today's problems. Talk to the business people."

Once the business goals are defined, the technology must be assessed. "We developed a strategic plan by combining the technical outlook with the business outlook," Hershkowitz said.

When the strategic plan is complete, a feasibility study must be performed, requiring in-depth analysis of departments' needs. The study must be thorough. "You must interview people personally," Hershkowitz said. "Distributing a questionnaire isn't enough because the user will often not understand the questions."

The feasibility study must also analyze and summarize company requirements, evaluate alternatives and analyze the economic benefits.

After a feasibility study is complete and



CW Photo by J. Bartimo

Harvey Hershkowitz

the company knows what it needs, a vendor must be found that can meet these needs. The first step in selecting a vendor is to develop a request for proposals and submit it to a select number of vendors. Then, the responses must be analyzed and existing sites visited, Hershkowitz said.

Finally, a vendor is selected and, over a period of years, the network is developed and implemented. "Once you get into a system like this, you're in the communications business — you're a phone company," Hershkowitz said. "You have to have the resources for this. You have to decide if your willing to do it. At Chase, the answer was 'yes.'"

Begun in the late '70s,
(Continued on Page 56)

Stationmate Combines Mux, Smart Modem and Interface

HUNTSVILLE, Ala. — Complexx Systems, Inc. has introduced a microcommunications system and two statistical multiplexers.

Stationmate combines a statistical multiplexer, an intelligent modem with automatic dialer and a local-area network interface in one device. The device is said to provide three data ports with RS-232C connectors. Stationmate costs \$1,450.

The Mx4 is a four-channel statistical multiplexer for synchronous and/or asynchronous data. The unit offers a buffer of 4K byte/port. Suitable for satellite support, the unit costs \$1,650.

The Mux 4/8 may be configured as a four- or eight-channel unit. The modem and the channel expansion are contained on printed-circuit boards that snap into place and configuration information is menu-driven. The unit costs \$1,850.

All three products use an adaptation of the X.25 Level 3 communications protocol, providing automatic switching, port selec-

tion and port class selection, according to a vendor spokesman.

Complexx Systems can be reached through P.O. Box 12597, Huntsville, Ala. 35802.

Two Versions of PC Express

Integrated Tool Fits IBM Micro

PALO ALTO, Calif. — Intelligent Technologies International Corp. has unveiled two versions of an integrated telecommunications package for the IBM Personal Computer.

The PC Express is said to allow an IBM Personal Computer to provide micro-to-micro communications, electronic mail, direct access to mainframes and a variety of automated telephone management capabilities.

The package consists of software and tutorials on diskettes. It includes a printed-circuit board that plugs directly into an IBM Personal Computer or computers that are compatible with the IBM Personal Computer, according to the vendor spokesman.

The PC Express I, for users who do not need 3270 emulation, allows communications with standard asynchronous mainframes and with other microcomputers. It costs \$895.

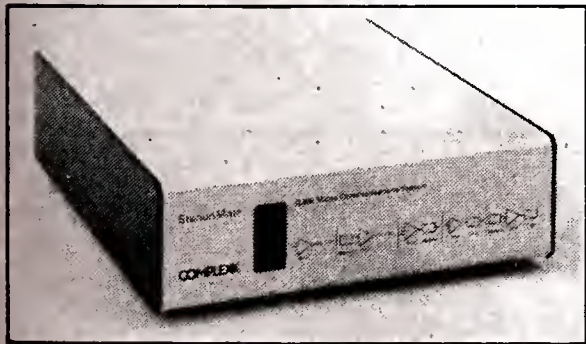
The PC Express II utilizes IBM's Systems Network Architecture to provide



PC Express

3270 emulation and provides asynchronous protocols supporting Digital Equipment Corp. VT100/52 terminal emulation, the vendor said. The PC Express II costs \$1,295.

Both products will be available in June from Intelligent Technologies International, 151 University Ave., Palo Alto, Calif. 94301.



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Ties to DDS

Bell-Compatible DSU Unveiled

SIMI VALLEY, Calif. — Teleprocessing Products, Inc. has introduced a Bell-compatible Data Service Unit (DSU) said to offer an independent interface with Bell's Dataphone Digital Service (DDS).

The TP-500 DSU, designed as a direct replacement for the Bell DSU-500B, reportedly features a built-in test pattern generator and detector. With built-in diag-

nostics, front panel status display and switchable data rates of 2,400, 4,800 and 9,600 bit/sec, the unit is stand-alone or rack-mounted.

The TP-500 reportedly incorporates advanced circuit design techniques with a lower component count. As a result, it provides higher reliability and reduced power drain, the vendor said.

All controls and options of the TP-500 DSU are situated

to be externally accessible.

Available in June, the unit will cost \$650. Further information is available from Teleprocessing Products at 4565 E. Industrial St., Building 7K, Simi Valley, Calif. 93063.



Teleprocessing Products Data Service Unit

Color Terminal Boasts Graphics, Alphanumeric

HARRISBURG, Pa. — Daisy Data Terminals Corp. has announced a color graphics terminal featuring a 14-in. screen and the ability to display either graphics or alphanumeric.

The Daisy C-1 terminal is available for most commonly used mainframe and mini communications protocols, a vendor spokesman said. The display is 24 lines by 80 columns or 24 lines by 132 col-

umns with both options simultaneously available on-line.

Alphanumeric and graphics displays are created by the programmer using standard programming languages.

The terminal sells for \$2,750, according to the vendor. More information is available from Daisy Data located at 1425 Montfort Drive, Harrisburg, Pa. 17110.

CRC Line Carrier Offered

SEATTLE — Communications Research Corp. (CRC) has unveiled a multichannel line carrier for data transmission over ac power lines.

The LCM400 line carrier modem is said to be an expanded version of CRC's LCM100 and has the capability of networking up to four peripherals at 9,600 bit/sec over ac power lines in a building.

The modem was designed to give users the ability to

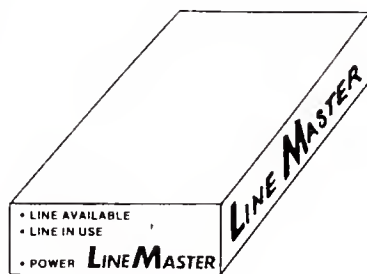
transmit data over greater distances with more power and receiver sensitivity and facilitates a variety of networking situations.

In addition, the LCM400 has an internal field-selectable dedicated line output for long distance and other networking applications, according to the vendor.

The modem costs \$447, available from CRC, 1720 130th Ave. NE, Bellevue, Wash. 98005.

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Connecting Data Centers

Time Division Multiplexer Bows

MIDDLETOWN, R.I. — A time division multiplexer said to connect large regional data centers by subdividing high-speed synchronous trunks into usable lower channel speeds has been announced by Scitec Corp.

The Bit Synchronous Processor (BSP) T1 integrates voice and data channels from 50 to 256K bit/sec and supports up to 128 channels expandable in four-channel increments, the vendor said.

Said to interface with "virtually any" voice or data device, the unit reportedly subdivides trunks as fast as 2.048M bit/sec.

The unit is housed in an

eight- or 28-channel enclosure.

Prices start at \$2,500 from

the firm located at 811 Aquidneck Ave., Middletown, R.I. 02840.

VS/VT Said to Simulate VT100s for Wang VS Users

SHERMAN OAKS, Calif. — Glenn A. Barber & Associates, Inc. (Gaba) has developed software said to simulate a Digital Equipment Corp. VT100 terminal for users of Wang Laboratories, Inc. VS workstations.

With VS/VT plus Wang's telecommunications hardware and VS Asynchronous Communications Program

software, VS users may access any host computer expecting a VT100 or equivalent over standard asynchronous lines.

Said to handle asynchronous lines up to 9,600 bit/sec, VS/VT carries a license fee of \$5,000 from Gaba at Suite 302, 15010 Ventura Blvd., Sherman Oaks, Calif. 91403.

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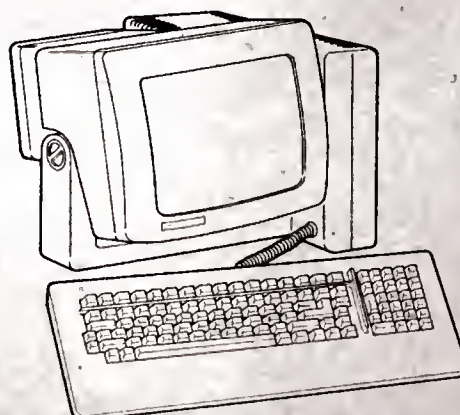
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The Displaywriter also provides 3270 data stream compatibility and, for VM/370 users,

access to the IBM Professional Office System (PROFS). With PROFS, documents can be filed, retrieved and distributed to other Displaywriters, 3270s, or IBM Personal Computers. PROFS also offers calendar scheduling and administrative services for managers, secretaries and other professionals.

What IBM has done, with this latest addition of data, is simply to make the Displaywriter even more indispensable.

To arrange for a free demonstration of the Displaywriter, call your local IBM representative or IBM's toll-free number listed below.

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*UCSD p-System is a trademark of the Regents of the University of California. **UCSD Pascal is a trademark of the Regents of the University of California.

Links Ascii With TWX, Telex

Envax Adds 600 Series CPU to Line

IRVING, Texas — Envax Systems, Inc. has announced its Envax 600 series processor as a new generation to its Envax product line. The 600 series is said to provide users with the ability to use any Ascii, asynchronous terminal, word processor or personal computer to interface to Western Union's Telex I, Telex II (TWX), direct distance dialing (DDD) or pri-

vate-line networks.

The series reportedly simplifies the communications process and provides a text editor for message preparation and creation of forms for permanent storage. There are three models in the series: 601, 611 and 650.

The 601 reportedly provides communications over the TWX network and DDD, the 611 over the telex net-

work and the 650 combines the features of the other two.

The minimum system has a Zilog, Inc. Z80 CPU with a 16K-byte memory, eight-year battery backup, RS-232 interface port and built-in modem, and prices start at \$1,195. Maintenance is provided by Western Union, according to Envax Systems, located at 330 Stovall, Irving, Texas 75061.

Intertel Expands Line Of Net Control Modems

ANDOVER, Mass. — Intertel, Inc. has expanded its line of network control modems (NCM) with a unit said to provide synchronous operation over unconditioned lines at 9,600 bit/sec.

The NCM 9600 reportedly supports point-to-point and multipoint networking.

In point-to-point communications, it conforms to CCITT V.29 recommenda-

tion, the vendor spokesman indicated.

In multipoint applications, the unit offers turnaround of 25 msec from request to send/clear to send, according to the spokesman for the vendor.

The unit, in stand-alone and rack-mounted versions, costs \$4,770 from the vendor at 6 Shattuck Road, Andover, Mass. 01810.

Setting Up Networks

(Continued from Page 53)

Chase's national, international and local networks involve both data and voice. For the domestic and international voice network, Chase implemented a dual switching network that includes a mix of AT&T's Centrex and dedicated private branch exchange systems.

For international and national data, the New York bank chose a private packet switching network instead of a public network because the private network offered reduced costs, faster reaction to users' needs and the servicing of unique protocols, Hershkowitz said.

To complete the architecture, a local-area network is still under development. It will be a private broadband cable network for intra- and interbuilding communications.

However, running cable from one building to another presented some problems for Chase because it then had to deal with the city bureaucracy. "Whatever time you guess it will take to deal with the local government, double or triple it and you will know how long it will really take," Hershkowitz warned.

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Backus Security System Out

SAN JOSE, Calif. — Backus Data Systems, Inc. has announced a user-programmable computer security system designed to perform security checks prior to caller entry to the host.

The Backus Security System, a three-channel device installed between host computers and dial-up modems, handles all logon and password recognition externally

to the host computer. Access to the security system directory for password changes and updates can only be done from the central site by a designated individual assigned the master key password in the system's memory.

A typical six-port system accommodates up to three incoming calls simultaneously, according to a vendor

spokesman. Each caller is prompted to present his or her designated account number and password and, if desired, a telephone number for preprogrammed directory comparison. The price for the three-channel (six ports) security system is \$1,485. More information is available from the vendor at Suite 110, 1440 Koll Circle, San Jose, Calif. 95112.

High-Speed Data Modem Doubles Transmission Rates

MOUNTAINSIDE, N.J. — A high-speed group data modem that is said to provide up to double the data transmission rate of other ground-band modems for digital transmission of business communications has been announced by Muirhead Data Communications Ltd.

The Muirhead H153 modem reportedly operates at rates up to 168K bit/sec and

can be used to provide two 64K- or three 56K bit/sec channels as advance provision of planned digital services and satellite communications.

The modem is reportedly used for internode links in private digital networks and computer-to-computer and computer-to-high-speed-printer links.

Custom-built to specification, the modem starts at \$30,000. More information is available from Muirhead North America, Inc., Data Communications Division, Mountainside, N.J. 07092.

Council Gets New Name

WASHINGTON, D.C. — The Ad Hoc Committee for Competitive Telecommunications has changed its name to the American Council for Competitive Telecommunications (ACCT).

ACCT's purpose remains unchanged — to oppose those features of legislation that would be inimical to competition in the telecommunications industry and to promote the adoption of provisions that would foster competition.

The group represents five specialized common carriers and four value-added, resale and video carriers. ACCT can be reached through John P. Guttenberg Jr. at Guttenberg Associates, Inc., 1627 K St. N.W., Washington, D.C. 20006.

WHAT WERE ONCE PIPE DREAMS ARE NOW A REALITY. Office automation. Professional work stations. Intelligent terminals. For years, we at Teletype Corporation—a subsidiary of Western Electric—have been dreaming about developing terminals for these applications. And now with the dawning of the Information Age, our dreams are coming true.

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Especially useful for programmers, the 5620 can access multiple software programs simultaneously.

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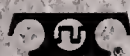
While we're branching out into new areas, we're also focusing on improving the products and services that have built our reputation. This is evidenced by our development of more sophisticated terminals for network control systems. And as always, you can depend on our established, expanding nationwide service organization.

Much of what we're doing has been made possible by expanding our research and development. This year alone, we're increasing R&D expenditures by over 25 percent. It's helping us become more competitive in terms of product technology, features and functions. So that in the long run our reputation for value will become even stronger.

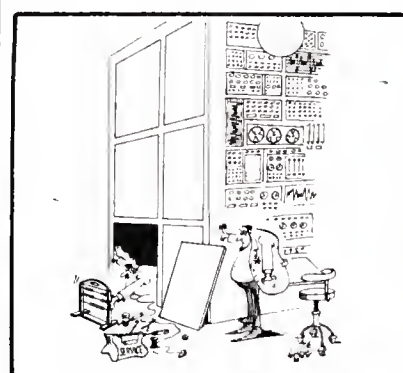
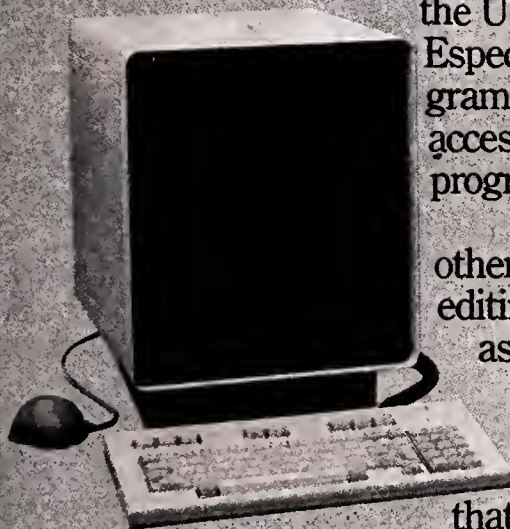
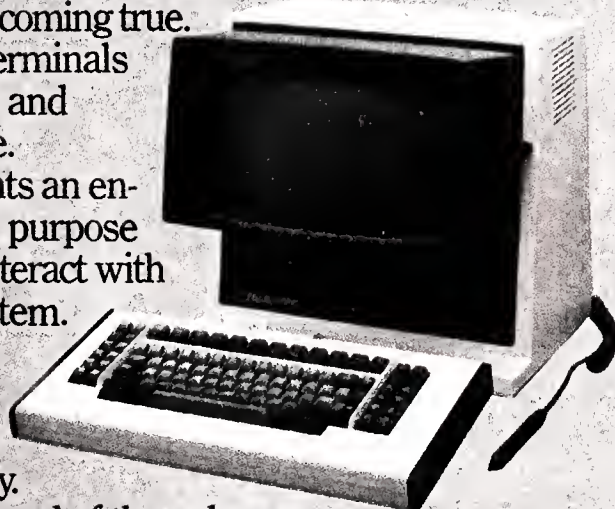
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Performance, Reliability Most Wanted Features

Report Covers Distributed Systems Mart

FRAMINGHAM, Mass. — With distributed processing systems now providing direct access to more functions within large organizations than they did five years ago, management information systems (MIS) directors of these firms say the most important consideration in purchasing a distributed processing system is its performance and reliability.

This was one of the findings of a recently released International Data Corp. (IDC) report titled "Distributed Systems Market: Overview." As part of the report, a survey of 25 MIS managers from Fortune 500 companies was conducted to determine what were their 10 most important considerations in selecting a distributed process-

ing system.

After performance and reliability, the managers' other top nine considerations in selecting a distributed system were: maintenance, systems compatibility, software availability, vendor reputation, multifunction capability, system flexibility and upgradability, cost, user friendliness and equipment availability.

While system reliability has always been an important issue among MIS directors, it is even more critical now than in the past, the survey said. In the past, system downtime was costly and inconvenient but for the most part tolerated. But with an increasing number of users depending on system resources to do their

jobs today, downtime can oftentimes be disastrous to a company's business and significantly more expensive.

With distributed systems expected to become more standardized in terms of their design and functionality over the next few years, managers will be less interested in the technology of the product and more interested in how easily it can be installed and used, compatibility with existing and planned equipment and upgradability. These are the reasons why

(Continued on Page 64)

Corvus Systems Unveils Variety Of Micro Devices, Enhancements

SAN JOSE, Calif. — Corvus Systems, Inc. has announced a total of eight microcomputer products ranging from a mass storage device for a variety of microcomputers to enhancements to the firm's Edword and LogiCalc software packages.

The Bank is a mass memory device for microcomputers manufactured by IBM, Apple Computer, Inc. and Corvus. The unit takes up about the same amount of space as a micro Winchester disk drive and can store up to 200M bytes of data. The Bank is available in 60-, 100- and 200M-byte capacities with a top-of-the-line 200M-byte model costing \$2,195, the vendor said.

The firm also announced Concept+, a single-user version of the firm's Concept personal workstation. Designed for the OEM market, the unit was designed to operate with Bell Laboratories' Unix operating system. Concept+ costs \$6,995 for a system with 768K bytes of random-access memory and a 256K-byte CRT terminal, the vendor said.

Corvus is offering users of Digital Equipment Corp. Rainbow 100 microcomputers a Winchester disk mass storage subsystem. The subsystem is available in 5.7M-, 12.1M- and 18.4M-byte capacities and costs from \$2,495, the vendor said.

Enhanced releases of the Corvus Edword word processing package and LogiCalc spreadsheet packages include bold

face, underline and strikeout for Edword. LogiCalc enhancements include changes to title fields, input fields and user-selectable defaults.

Edword is offered with the Concept processor. The LogiCalc package costs \$195, the vendor said.

A utility server designed to replace a dedicated processor as a printer server on the Corvus Omninet local-area network is available for \$990, the vendor said.

Corvus also announced its Omninet local-area network can now be used on Apple II and Apple III systems. The Apple interface costs \$495, and the Omninet software costs \$100, the vendor said.

Finally, Corvus announced a third-party software plan that offers selected packages from third-party software vendors for the Corvus Concept processor.

Corvus is located at 2029 O'Toole Ave., San Jose, Calif. 95131.

3R Announces Dual Processor, \$200 Price Cuts for TC1, TC10

WESTBORO, Mass. — A dual-processor system that reportedly transforms all asynchronous and IBM 3278-class terminals into intelligent workstations has been introduced here by 3R Computers, Inc. At

the same time, the vendor announced price cuts of \$200 on its TC1 and TC10 Universal Terminal Converters.

The Avatar TC100 offers both Digital Research, Inc.'s CP/M and CP/M-86 and Microsoft, Inc.'s MS-DOS operating system software capability, enabling the user to run a wide range of packaged application software. In the on-line mode, the system reportedly allows normal terminal-to-computer functionality. In the local mode, it delivers full computing power with local data storage and host computer communications, according to 3R.

The product also features a single-board, shared memory architecture with both a Zilog, Inc. Z80 and Intel Corp. 8088 microprocessor with 128K bytes of random-access memory, expandable to 256K bytes. It includes ports for connection to host computers, local printers and corporate and public information data bases, the vendor said.

The Avatar system is presently available with single or dual 5¼-in. floppy diskettes for up to 1.6M bytes of removable storage or an integrated Winchester/floppy disk system for up to 21M bytes of storage. The product is priced from \$2,195 to \$6,295.

Further details may be obtained from 3R at 18 Lyman St., Westboro, Mass. 01581.

Get the Picture by Contributing To CW's Special Report on Graphics

Is one picture really worth a thousand words? Or — more importantly — is the picture worth the cost of generating it in terms of time savings and productivity gains?

Computerworld's July 25 issue will contain a Special Report on graphics systems. The report will explore the latest technologies, techniques and applications in the computer graphics market, covering the range of applications from computer-aided design (CAD) to all levels of business graphics.

In particular, CW wants to look at emerging trends in low-cost CAD and three-dimensional graphics, graphics terminals and software, the market for color printers and other output equip-

ment and boardroom graphics. We'd also like to see the cost-cutting benefits and time savings that can be realized with a graphics system.

CW welcomes submissions of graphics application stories, war sagas, tutorials and other testimonials related to the report. The manuscripts, which must be submitted by June 10, should be no longer than four to six double-spaced, typewritten pages. Preference will be given to articles with black-and-white photos, charts or graphs (originals, please).

The stories should be sent to Jim Bartimo or Bill Laberis at Computerworld, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

For Bookkeeping Procedures

Morrow Unveils Turnkey

SAN LEANDRO, Calif. — A turnkey system intended for small business bookkeeping procedures has been unveiled here by Morrow Designs, Inc.

The MD3 Business Computer comes with Digital Research, Inc.'s CP/M operating system software and seven other software packages that handle daily office functions such as word processing, spreadsheet and general ledger. The hardware consists of a full-featured terminal, keyboard, two double-sided 5¼-in. floppy disk drives and an 8-bit microcomputer, according to the vendor.

With a list price of \$2,495, the MD3 Business Computer is available

from Morrow Designs, Inc. at 600 McCormick Ave., San Leandro, Calif. 94577.

Raster Beefs Up Model One Line

NORTH BILLERICA, Mass. — Raster Technologies, Inc. has added a color graphics controller and a two-dimensional display list capability to its Model One family of graphics systems.

The Model One/25 graphics controller was designed to support image memory configurations of 512 pixels by 512 pixels with up to 24 bit planes. The Model One/25 includes a 16-bit microprocessor, 128K bytes of random-access memory and 64K

bytes of programmable read-only memory. The unit costs \$10,500.

The two-dimensional display list capability offers users the ability to perform local processing on a stored graphics data base. The feature costs \$1,000 and is available on new models of the firm's Model One/25, 40 or 60. The feature can also be retrofitted to existing Model One/40 and One/60 units, the vendor said from 9 Executive Park Drive, North Billerica, Mass. 01862.

DEC TSV05 Version Out

systems.

The TSV05-AX is reportedly rack-mountable and front loading and has a choice of 25 or 100 in./sec read/write capability. It has a tape density of 1,600 bit/in., with the data phase-encoded. The device uses Ansi-standard 9-track, 10½-in. reels of ½-in. tape and features automatic loading, the vendor said.

The TSV05-AX is priced at \$8,900, DEC said from headquarters in Maynard, Mass. 01754.

Qantex Printer Uses Diablo Code

HAUPPAUGE, N.Y. — The Qantex Division of North Atlantic Industries, Inc. has come out with a printer that reportedly is compatible with Diablo Systems, Inc. printer escape codes.

The Model 7040 also offers single-sheet feed capability, multiple speeds, multiple fonts and multiple modes of operation, according to the vendor. The product can reportedly be used with a range of word processing or graphics packages.

The Qantex Model 7040 printer is available for \$2,195 from the vendor at 60 Plant Ave., Hauppauge, N.Y. 11788.

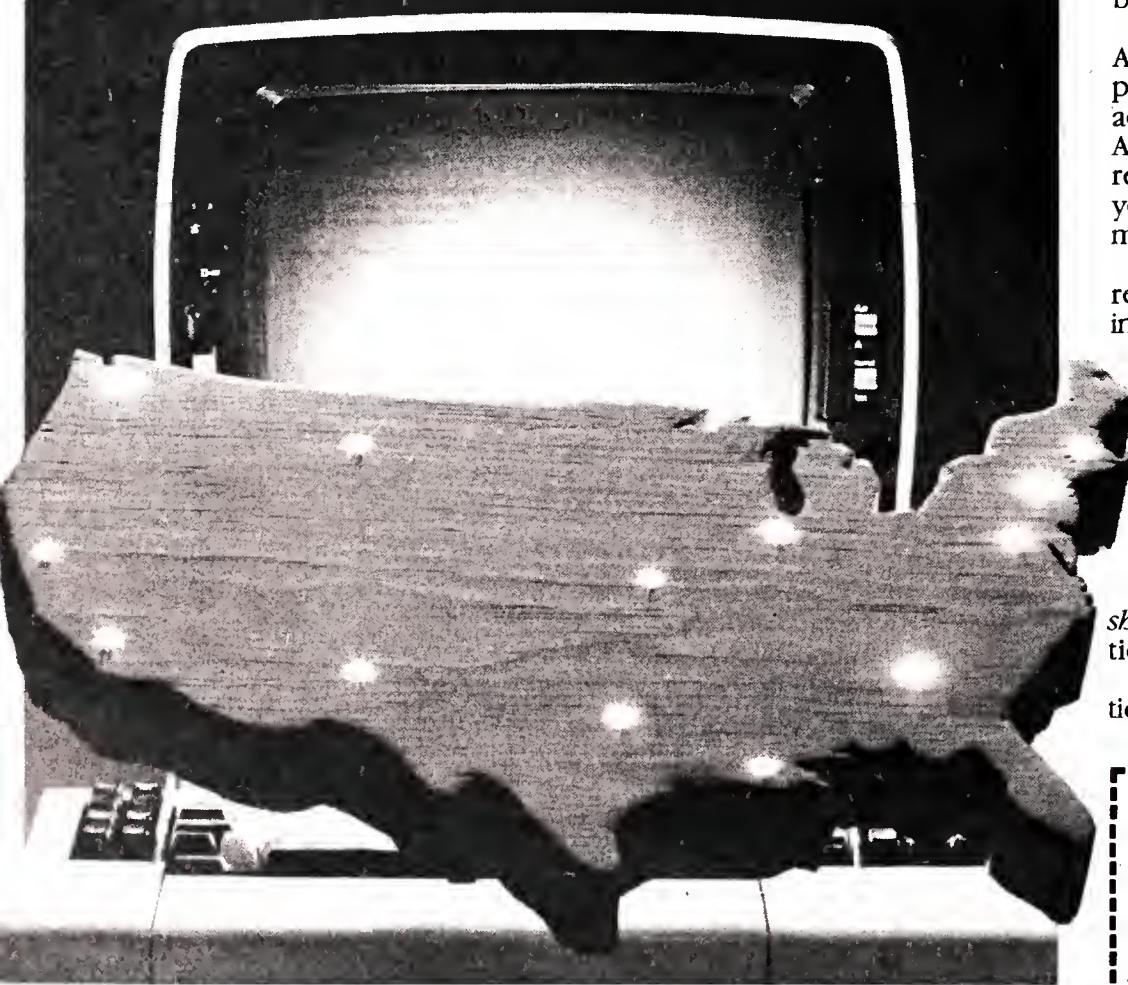
STC Announces WP Aid, Printer For Mini Line

WALDWICK, N.J. — STC Systems, Inc. has announced the Dataword Processing printer and the Skillword word processing package for the firm's line of turnkey minicomputer systems.

Skillword was designed to perform document manipulation functions in conjunction with data processing functions on STC Systems processors. The package includes more than 50 English-like commands that allow the user to create, edit, merge, copy and print a document. The package costs \$5,000, the vendor said.

The Dataword Processing printer offers users of STC Systems processors a 50 char./sec printer that can print in either a draft or data mode. The printer costs \$3,500, the vendor said from Four North St., Waldwick, N.J. 07463.

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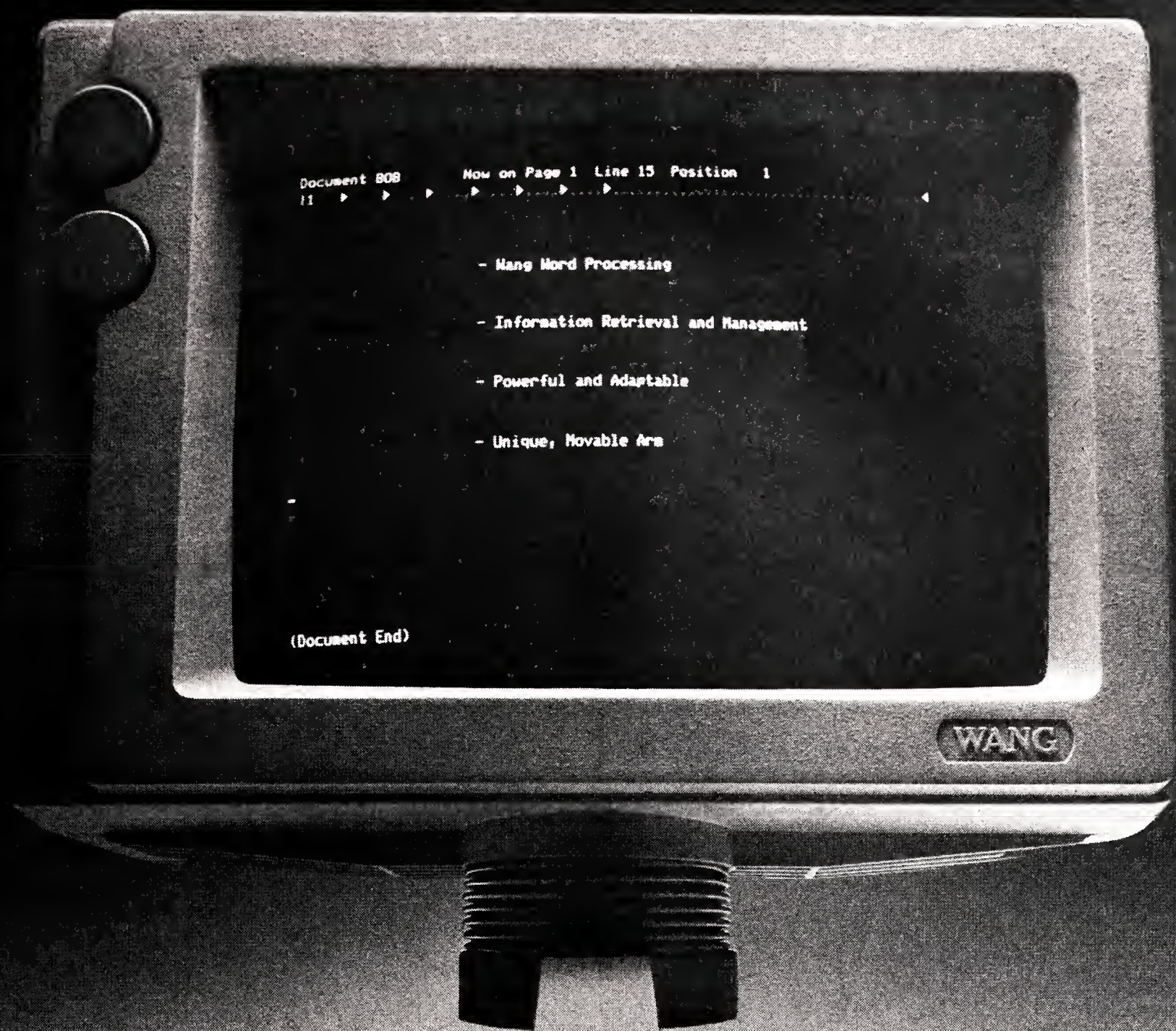
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Preview Issue: May 9th

Everything you need to know about the show before it happens. Our comprehensive NCC Preview Issue is all you need to guide you through the computer industry's largest trade exhibition.

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Show Issue: May 16th

This issue will have late-breaking show information, speech previews and final show details.

And we'll give you an issue crammed with the kind of news and technical information you need to keep up with the latest developments in computing — even if you're away from your office. It's information you can read in the newspaper and pursue right on the NCC floor.

Wrap-Up Issue: May 23rd

This is the issue that makes it all clear. That tells you why you went — or what you missed.

You'll get complete coverage of all that happened, prepared by our 35-person editorial staff. You'll read who said what, who introduced what and how it works, and review the show's features and highlights in words and pictures.

**Color ad deadline for the NCC Wrap-Up Issue is May 6.
Black & White is May 13.**



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NEC Winnie Family Expanded With Addition of D2257

LEXINGTON, Mass. — NEC Information Systems, Inc. has expanded its D2200 family of 8-in. Winchester disk drives with the addition of the D2257.

This product reportedly provides up to 167M bytes of storage capacity, with an average access time of 20 msec. Initially offered with a storage module device (SMD)-type interface for ease of integration with existing controllers, the D2257 in-

cludes address mark detect, detail error status reporting and mounting frame bracket, according to the vendor. In addition, a dual-port option is available which can further enhance overall system performance, the vendor said.

The D2257 sells for \$5,900, NEC said from 5 Militia Drive, Lexington, Mass. 02173.

Fits DEC Q-Bus-Based Minis

AED Disk Storage System Debuts

SUNNYVALE, Calif. — Advanced Electronics Design, Inc. (AED) has introduced a compact member to its family of disk storage systems compatible with Digital Equipment Corp.'s Q-bus-based minicomputers.

At the same time, the company announced price cuts of 35.5% on its AEDS11 stand-alone color graphics workstation, marked down

from \$31,000 to \$19,995.

The disk storage system, Winc-05, combines an 8-in. floppy disk drive and a 5¼-in. Winchester disk drive in a single cabinet to provide complete DEC floppy and hard disk emulation with one dual-width controller card, the vendor explained. The product reportedly supports single- or double-density 8-in. DEC RX02 floppy

disk formats, providing 512K bytes of storage per side for a total of 1M byte. It also supports DEC RL01/02 hard disk formats and includes either a 10.4M- or 20.8M-byte, 5¼-in. Winchester disk drive.

Pricing on the storage system starts at \$5,995, but the controller can be purchased separately for \$1,995. AED is located at 440 Potrero Ave., Sunnyvale, Calif. 94086.

Printer Gets Serial Update

BELLEVUE, Wash. — A serial version of its Model 130 - daisywheel printer priced at \$950 has been unveiled here by Transtar, Inc.

The Model 130S reportedly provides letter-quality print and a range of word processing functions. It is compatible with a number of word processing packages and supports DTR, ETX/ACK or X-On/X-Off protocols under switch control, the vendor noted. Transmission rates, in six increments from 300 to 9,600 bit/sec, can be set.

Further details on the Model 130S can be obtained from Transtar through P.O. Box C-96975, Bellevue, Wash. 98009.

Printer Targets Magna-Writer

CHICAGO — A 40 char./sec daisywheel printer has been introduced here by AB Dick Co. for high document output with the company's Magna-Writer entry-level word processing system.

The Magna-Writer 40 CPS printer features a 98-char. plastic printwheel available in a variety of commonly used type styles in 10-, 12- and 15 pitch, the vendor said. Its ribbon is a multi-strike version reportedly capable of reproducing up to 360,000 char./cartridge.

The product sells for \$2,895, from 5700 W. Touhy Ave., Chicago, Ill. 60648.

"Hyatt was a pioneer of local area networks. When Datapoint introduced the first one, we ordered."

—Bob Regan
V.P. Management Information Systems
Hyatt Hotels Corporation



"Local area networks are the hot topic in data processing these days. But they're nothing new to us," says Hyatt's Bob Regan. "Ours have been up and running for five years."

When Datapoint introduced the first local area network, the ARC® system, in 1977, Hyatt was among the first to install it. Today there are approximately 5,000 ARC local area networks in use, far more than any competing system.

"One reason the ARC network has been so effective for Hyatt is because it's easy to expand," says Regan. "Hyatt has had phenomenal growth, and the ARC has kept up. When more people needed the system to do more work, we simply added to the network."

The ARC local area network can be expanded virtually without limit by simply plugging in additional Datapoint processors, printers, storage disks, and terminals. Each new processor adds power to the

network so new users get the same fast response the original users were getting. Companies can closely match the power of an ARC system to their needs, expanding in small, inexpensive increments instead of buying "more computer than they need" in order to have room for growth.

What's more, Datapoint systems can be expanded or upgraded without replacing software. "We run some programs on ARC networks that were originally written for our first Datapoint computer more than ten years ago," says Regan. "That means we didn't lose any of the money we invested in programming and training. And it made the growth steps easy on our people. The changeover to the ARC network was accomplished in only two days."

No matter how far an ARC system is expanded, all the users can have access to all the data except where security precautions are installed. So even though more and more people are using more and more computers, there's never a

need to duplicate files.

"At present, Hyatt operates forty-five ARC systems," Regan says. "Others are in the planning stages right now. On the operations side we use them for accounting, reservations, and group sales. At Corporate we use them for accounting and for systems development. Obviously, we depend on them heavily. They're like the meters where we check our own financial performance. They simply have to work. And they do."

"Hyatt has stayed with the ARC system because it's been cost-effective. That's the bottom line. I can recommend a certain system to a hotel, but in the end, the system has to sell itself. And keep selling itself after it's installed. Our Datapoint ARC systems have done that."

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Graham Announces 3,000-Ft Tape

FORT WORTH, Texas — Graham Magnetics, Inc. has announced the Epoch 480 Plus, a 3,000-ft computer tape designed to increase information storage capacity.

The tape was designed for high-density disk pack backup applications. The tape is available in standard packaging configurations with

3,000 ft of tape on a 10½-in. reel or 1,500 ft on an 8½-in. reel, the vendor said.

Tapes are priced from about \$77 a reel with quantity discounts available.

The vendor is located at 6625 Industrial Park Blvd., North Richland Hills, Texas 76118.

MIS Managers Look for Performance

(Continued from Page 59)

most managers surveyed rated maintenance and vendor support as their second most important consideration in selecting a system, the survey said.

The most successful vendors of distributed systems, according to the survey, will be those vendors that offer users "a complete support approach," along with the hardware and software. From the user's standpoint, a complete support approach would consist of training, documentation, equipment designed for self-installation and diagnostics, user-friendly instruction programs, on-site maintenance and on-going training service for new personnel.

Systems compatibility was third on the list because most managers said they like the freedom of selecting equipment from a number of vendors that best meet their needs. Most managers interviewed said there are few vendors today that can successfully satisfy all the needs of a large organization. Another reason for using more than one vendor, they said, was the fear of being locked into a particular vendor's marketing strategy.

The report cites IBM as being the most successful vendor at the "captive user approach" but adds that "even IBM-compatible vendors have done quite well selling to allegedly 'IBM shops.'"

Managers placed software availability high on their list of priorities, citing the lack of "easy-to-learn" higher level software for nontechnical users as the biggest impediment to the proliferation of microprocessor-based systems in large organizations.

The increased availability of this higher level software will take place only after there is a better understanding of human information handling psychology and further hardware developments capable of supporting the more complex software, the report concluded.

Vendor size and reputation was rated fifth for the obvious reason that most managers want assurance that the vendor from which they buy the equipment will be around to support and upgrade that equipment five or 10 years from now.

Multifunction capability came next on the list. However, many of the managers interviewed feel there are not many systems available that successfully integrate data processing, word processing and communications into one package. Most managers interviewed see the percentage of such systems rising dramatically over the next five years as a wider variety of users gain access to system resources.

The obvious consideration of cost had a relatively low ranking because of two factors: first, the cost of hardware has been steadily declining;

second, users are much more concerned with issues concerning performance, reliability, maintenance and support, the report stated.

User friendliness was next to last on the list and is a consideration because of the growing number of non-technical users gaining access to information resources.

Unidata Enhancement Out For IBM, Apple, DEC Minis

PORTSMOUTH, N.H. — Unidata Systems, Inc. has announced the Graduate, a bundled microprocessor-based power enhancement device for microcomputers manufactured by

IBM, Apple Computer, Inc. and Digital Equipment Corp.

The Graduate consists of a Zilog, Inc. Z80B microprocessor, a fixed Winchester disk drive with either 5M or 10M bytes of storage, 320K bytes of random-access memory, four RS-232 communications channels, an IEEE 488 interface and a printer port. Software for the system includes Unisyn, a programming and business package. Unisyn includes a unified applications generator, a hierarchical and relational-like data base manager and a data dictionary.

The Graduate costs \$3,450, the vendor said from Newington Park, Portsmouth, N.H. 03801.

Equipment availability is an important consideration for most managers but not a critical one. Manufacturers of systems are using the economic advantages inherent in mass distribution.

More information on the study is available from IDC at 5 Speen St., Framingham, Mass. 01701.

There are two data communic

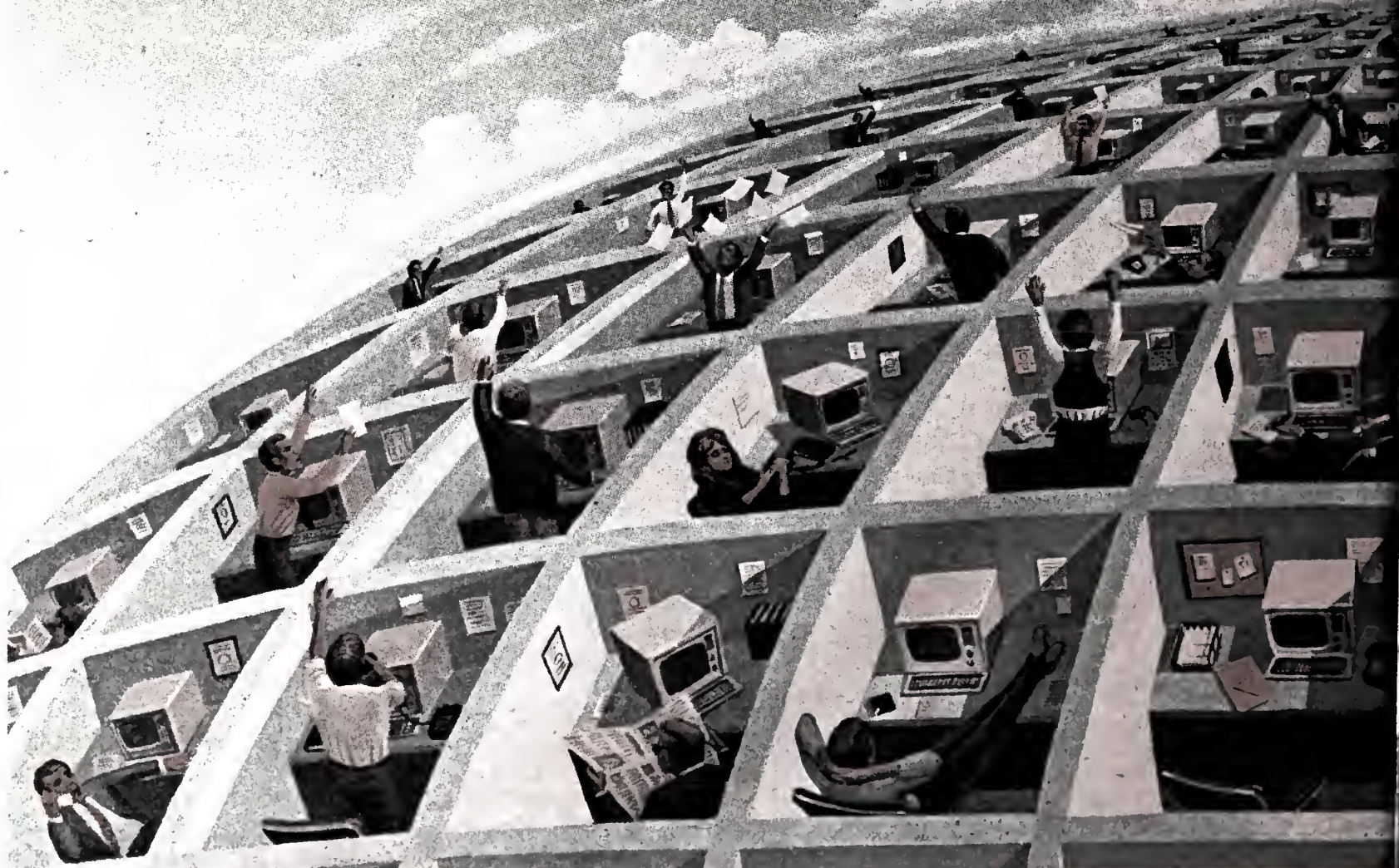
If you build your own data communications network, you have to maintain it yourself. And that means hours of planning, a big investment in capital equipment, dealing with vendors and the phone companies, providing on-going testing and diagnostics, and making a lot of phone calls when a problem arises.

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Do it Yourself



Line Printer Controller Connects Xerox to DEC

ORANGE, Calif. — The Xerox Corp. 2700 laser printer can be connected to Digital Equipment Corp.'s Q-bus, Unibus, VAX-11 and PDP-8 systems, as well as to a number of popular minicomputers, with the use of a line printer controller from MDB Systems, Inc.

The standard printer driver routines of the various operating systems are used by the MDB controllers to operate the Xerox 2700 at speeds up to 600 line/min, according to the vendor.

Each controller comes with a 25-ft interconnection cable and is priced from \$475 to \$1,995, depending upon computer type. Further details are

available from MDB at 1995 N. Batavia St., Orange, Calif. 92665.

Centennial 4M-Byte System Fits Sperry 1100 Mainframes

ROCKVILLE, Md. — Centennial Computer Corp. has introduced a 4M-byte memory subsystem that is compatible with Sperry Corp.'s 1100 series mainframe computers.

The 5600 Solid State Disk reportedly consists of two Centennial Storage Control Units and a

Offers 16 Device Places

Fleximem Board Serves IBM

SAN DIEGO — Raytronics, Inc. has introduced a random-access memory (RAM)/read-only memory

(ROM)/programmable read-only memory (Prom) memory board that supplies the IBM Personal Computer with 256K bytes of memory.

The Fleximem board reportedly contains 16 device positions, allowing the use of readily available byte-wide memory devices. It may be used with masked ROMs, RAMs or erasable programmable read-only memory devices, the vendor said.

The product retails for \$229. Raytronics can be reached at 4901 Morena Blvd., Building 900, San Diego, Calif. 92117.

Vector Sketch Announced For IBM Micro

ROCKVILLE, Md. — GTCO Corp. has announced Vector Sketch, a computer-aided design package for IBM's Personal Computer.

The package is suitable for a variety of applications including business graphics, space planning, construction and architectural, mechanical and electrical designs, the vendor said.

The package comes with a digitizer and costs \$2,995, the vendor said from 1055 First St., Rockville, Md. 20850.

Paragon System Offers Graphics

PACHECO, Calif. — Paragon Technology Corp. has introduced an interactive graphics system intended for printed-circuit board design and manufacturing applications.

The Paragon 100 System is a single-user system that offers distributed processing, quick response and interactive color graphics along with design automation features, according to the vendor. It utilizes the 16-bit architecture of the Digital Equipment Corp. LSI-11 microcomputer, along with a separate proprietary graphics processor.

Pricing on the Paragon 100 starts at under \$40,000, a company spokesman said from 421-5 N. Buchanan Circle, Pacheco, Calif. 94553.

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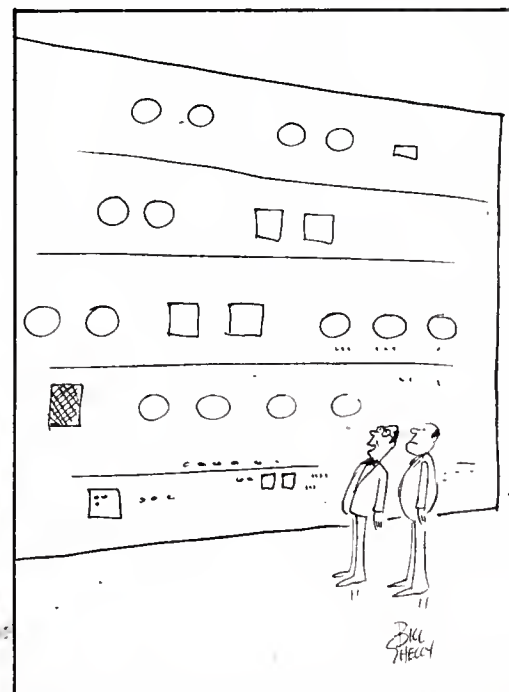
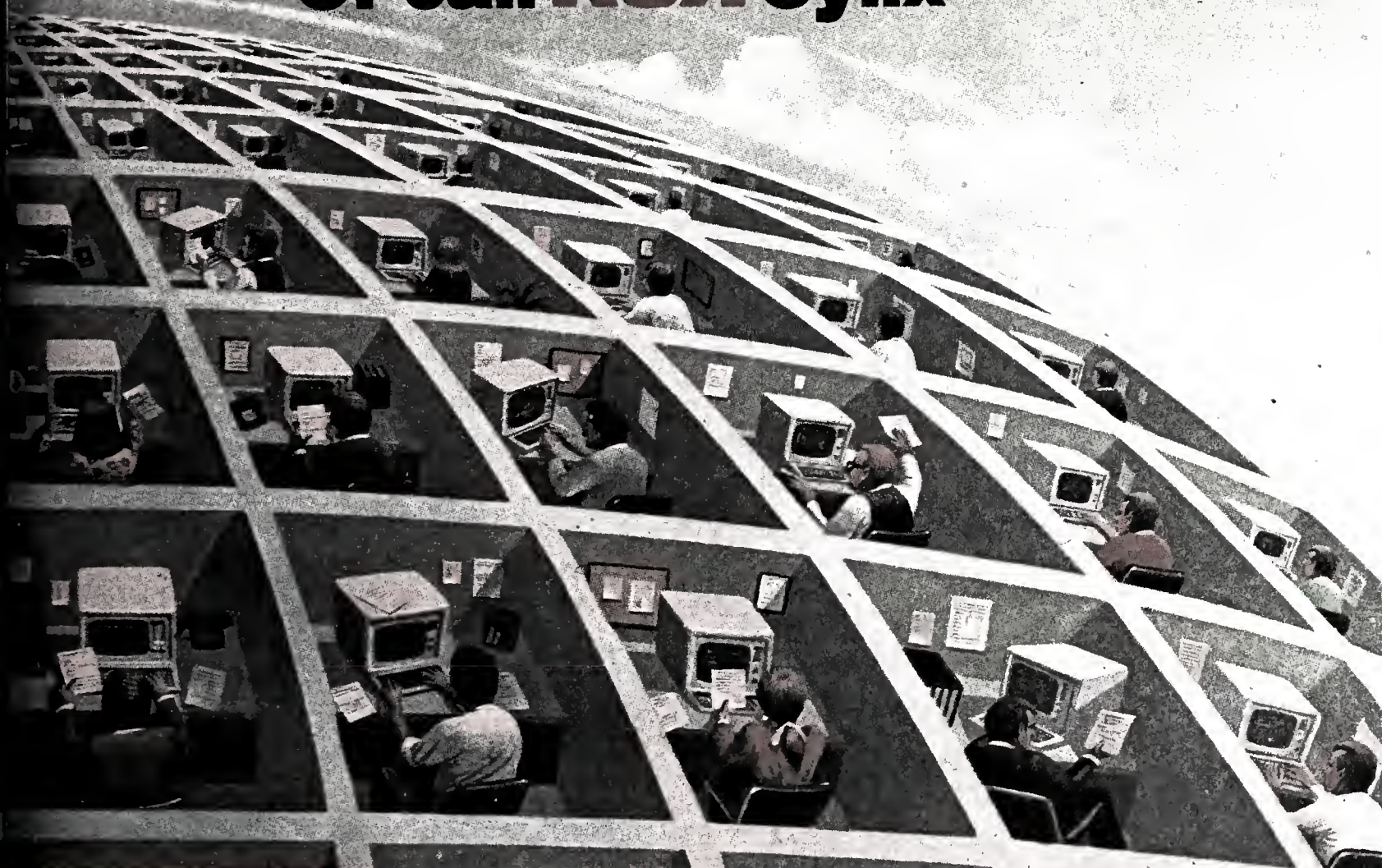
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Bits & Pieces

Exide Power Supply Fits Business Systems

RALEIGH, N.C. — Exide Electronics, Inc. has announced the Series 1000, an uninterruptible power supply for small business systems and terminal clusters.

The unit offers 90% throughput efficiency, a 20% input voltage tolerance, a 2% output regulation and sealed maintenance batteries. The Series 1000 has a power rating of 3 kVA, the vendor said.

The unit costs \$5,500 and is available from Exide Electronics through P.O. Box 58189, Raleigh, N.C. 27658.

Quadram Cuts Prices On Memory Boards

NORCROSS, Ga. — Quadram Corp. has announced price reductions on its line of memory boards for IBM's Personal Computer.

As an example of the price

reduction, the firm's 256K-byte Quadboard and Quadboard II units now cost \$595, a \$400 reduction; and the 64K-byte configurations now cost \$395, down from \$595, the vendor said.

In addition, the firm announced a no-charge software enhancement to the boards. Called Quadram, the enhancement allows the boards to control up to three random-access memory disks, the vendor said from 4357 Park Drive, Norcross, Ga. 30093.

Power Systems Out For Small Systems

ANAHEIM, Calif. — General Power Systems, Inc. has announced the GPS-3006 and GPS-5006 uninterruptible power supplies for small business systems.

Designed to operate from a 120 Vac 60 Hz power line, the units provide backup via a 60 Vdc battery, which can

sustain a full power load for 10 minutes. Options include a static switch, an RS-232 port and additional batteries, the vendor said.

The GPS-3006 costs \$1,250, and the GPS-5006 costs \$1,550, the vendor said from 1400 N. Baxter St., Anaheim, Calif. 92806.

OCR Unit Designed For Warehouses

LOS GATOS, Calif. — Caere Corp. has introduced an optical character recognition system for data recapture in stores and warehouses.

The Series 500 comes with either a wand or slot reader for data entry, according to the vendor. A string of up to 80 characters can reportedly be recognized in a variety of fonts. The Series 500 can be connected to most standard terminals that use dual port or standard parallel interfaces, the vendor said.

The product is available for \$1,295 from Caere Corp. at 100 Cooper Court, Los Gatos, Calif. 95030.

Color Graphics Gets Price Reductions

TUCKER, Ga. — Chromatics, Inc. has announced price reductions on its CGC 7900 line of Motorola, Inc. 68000-based color graphics computer system.

The base price on the Model 7900-01 now costs \$11,995, down from \$12,995, and the Model 7900-03 was reduced \$4,000 to its current purchase price of \$20,995.

The firm is located at 2558 Mountain Industrial Blvd., Tucker, Ga. 30084.

Westinghouse OCR Runs on Minis, Micros

IOWA CITY, Iowa — An optical character reader from Westinghouse Information Services reportedly simplifies medium-size data processing needs through ease of operation and adaptability to collect and process data from a variety of sources and locations.

The Model WM50 is intended for use with minis and microcomputers with RS-232 asynchronous communications capabilities. The controls of the system consist of three switches for operating the scanner and a four-position alphanumeric status indicator. The product also has a counter for tallying the number of documents read.

The WM50 costs \$36,000. Further details are available from the vendor through P.O. Box 30, Iowa City, Iowa 52244.

Controller Boards Fit Impact Printer

WALTHAM, Mass. — Keltron Corp. has announced a series of interface controller boards for the Epson America, Inc. Model 150-II impact printer mechanism.

Keltron's controller boards consist of three models. The Model C161 accepts parallel binary coded decimal data; the Model C162 accepts RS-232/20mA current loop input data; and the Model C163 accepts alphanumeric 8-bit parallel Ascii encoded input, the vendor said.

The boards cost \$150 in quantities of 100, the vendor said from 225 Crescent St., Waltham, Mass. 02154.

Ligo Unveils Angel, Smart Print Buffer

CHICAGO — A microcomputer-based intelligent print buffer featuring page mode print controls has been introduced here by Ligo Research, Inc.

Angel, as the product is called, is packaged in a compact case with 64K bytes of

random-access memory, eight key controls and six LED indicators displaying the buffer status and activities. Also included with the product are both RS-232 serial and Centronics Data Computer Corp. parallel I/O interfaces, serial transmission rates from 110 to 19.2K bit/sec and externally switch-selectable parity and data bit size, the vendor said.

Angel is priced at \$295. Ligo Research is located at 396 E. 159th St., Harvey, Ill. 60426.

Tape Controller Fits Apple III, IEEE-488

SAN DIEGO — Innovative Peripheral Systems has announced a tape controller for the Apple Computer, Inc. Apple III processor that is compatible with the IEEE-488 standard.

Called the APL-488CT, the unit fits into a single slot in the Apple III backplane. Features include a data transfer rate of 50K byte/sec, necessary cable and compatibility with an SOS driver, the vendor said.

The APL-488CT costs \$495, the vendor said from 4060 Morena Blvd., San Diego, Calif. 92117.

Edit Pak System Has Expanded Capacity

ORLANDO, Fla. — Technology International Corp. has expanded the disk capacity on its Edit Pak System II and Edit Pak System III microcomputers.

The Edit Pak System II is now available with up to 624K bytes of memory per disk drive. The previous maximum disk storage was 272K bytes per drive. The System II costs \$5,995, the vendor said.

The System II is now available with 1.2M bytes of disk storage. The unit costs \$6,495. The vendor can be reached through P.O. Box 13457, Orlando, Fla. 32859.

Code 39 Bar Code Printable With TIP

IRVINE, Calif. — Trilog, Inc. has announced an optional feature for use with the vendor's TIP line of printers that reportedly allows users to print Code 39 bar code.

The bar coding capability will also provide combinations of Code 39 bar code with both standard text and Style A of the Optical Character Recognition Code, according to the vendor.

It is available for both TIP 150 and TIP 300 printers, according to the vendor.

The Trilog bar-code option costs \$250, the vendor said. Trilog is located at 17391 Murphy Ave., Irvine, Calif. 92714.

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April 21, 1983

Sends Him Back to Qwerty

Dvorak Keyboard Plays Blues for Author

By Dave Horton
Special to CW†

The American National Standards Institute's (Ansi) recent adoption of the Dvorak Simplified Keyboard (DSK) as the new standard keyboard inspired me to make an effort to fit into Ansi's brave new world. Since my keyboarding speed has never been great, I resolved to give the new keyboard a try.

The word processors used in my office are said to have the most flexible keyboard configuration available to a user. One member of our staff created a new keyboard table that would logically transform my keyboard into the DSK standard.

At the same time, I prepared little round yellow stickers to affix to the front edge of the keys so the DSK location of each would be marked. After two WP operators in my office threatened me with bodily harm, I prevailed upon the newest operator (who had been with us only a few weeks) to allow me to desecrate his keyboard with bright yellow stickers.

Yellow Spots at Lunch Hours

Fortunately, the keyboard table is only invoked at a user's option, so the WP operator did not have the DSK. He did report seeing yellow spots after the first day of using the keyboard. Nevertheless, I was now prepared to use the keyboard whenever the WP operator and I both had time available. That usually meant lunch hours.

It was with great excitement that I sat in front of a blank screen, called up my status menu and typed "DSK" to invoke the keyboard table. Disorientation set in quickly. It turned out only the "A" and the "M" are in the same place on the Dvorak Simplified Keyboard and standard Qwerty keyboard.

Those were the first two keys that I learned. As I began to touch-type, albeit slowly, hitting the "A" or the "M" would cause my fingers to revert to the habits they had picked up over the past 15 years.

During my first session on the DSK I was aggravated that trying to type with the correct fingers resulted in my hands hiding the little yellow dots to which I desperately needed to refer. It would have been much faster to hunt and peck. At least then I could have easily seen the letters I was trying to press.

I decided I was not using a good approach to learning the new system and resolved to devote the next few sessions to drill so that I could learn the new keyboard before I started real work.

The motivation to do drills was hard to find. The next time I had a short report to write, I started with 10 minutes of drill. Then I plunged into real work. What followed for the next 30 to 40 minutes was not a pretty sight; the onset of frustration was quick, and tension began to build between my shoulder blades.

At first, I could maintain the concentration needed to force my fingers to locate

the new key positions. Finally, I could no longer force my fingers from going back to their old habits. In five pounding keystrokes, I returned my keyboard to its Qwerty configuration for the duration of the report.

Several days passed before I could get over the apprehension and try DSK again. I had to admit, though, that certain keystroke combinations felt good. After a few more sessions, progress was still slow. Each keystroke was deliberate and required thought, which took away from the thoughts available for expressing myself.

I foolishly pulled out my calculator/stopwatch combination and pressed the start key. I proceeded to type an error-free 5.7 words per minute.

Outraged, I immediately retyped the same information using the Qwerty keyboard at 39.07 words per minute. Then I wrote this article.

Do you have any doubt which keyboard I used?

Horton is a systems analyst with the Texas Department of Human Resources and is responsible for office automation planning as well as internal consulting.

Information Management Congress Offers Slide Program, Book on OA

WASHINGTON, D.C. — A slide/script program called "The Automated Office" and a book titled *Tomorrow's Office Today: Managing Technological Change* are available from the International Information Management Congress.

The slide program, written by Don Avedon, executive director of the International Information Management Con-

gress, explains the concept and reasons for office automation, covering document processing from creation to hard copy and soft display output. Topics included in the slide program include word processing, data processing, micrographics, optical character recognition, intelligent copiers and communications.

Tomorrow's Office Today covers the effects of the declining cost of new technologies — computers, word processors, communications systems and integrated information processing systems. Aimed at ensuring cost-effectiveness in an automated office, the book provides a practical framework to show how to plan for and implement technological change.

The slide program, with a printed script and 94 color slides, costs \$100. The book is priced at \$39. More information is available from the International Information Management Congress, P.O. Box 34404, Bethesda, Md. 20817.

Sysm Electronic Mail System Enhanced With Teletype-Compatible Support

BOISE, Idaho — H&W Computer Systems, Inc. has announced a new release of its Sysm electronic mail system.

Sysm is said to operate on any IBM mainframe using CICS. It has been enhanced to include teletype-compatible (TWX) support that enables frequent travelers to stay in touch with the home office, a vendor spokesman said.

The CRT-based system uses a full screen editor while the TWX editor works on a line-by-line basis. After a message has been composed, it can be played back for final review, then either saved for further review, deleted from the system or sent. The status of messages that have been created can reportedly be checked with two out-basket management options that re-

view all messages created and display all sent messages, according to a vendor spokesman.

Sysm is available for a perpetual license fee of \$8,500.

More information can be obtained from the vendor through Box 4173, Boise, Idaho 83711.

Whiz 2480 Boasts Addressing Software, Micro-Based Workstation Combination

RANDOLPH, Mass. — Addressograph Farrington, Inc. has introduced an electronic addressing system with a micro-computer-based workstation that report-

edly combines addressing capabilities with software for word processing and financial reporting.

The Whiz 2480 features six-line addressing software, said to be geared to large-volume, direct-mail list maintenance. The word processing includes personalized auto-letter writing, and the financial software contains general ledger, accounts payable, payroll and accounts receivable modules, a vendor spokesman said.

The complete addressing system includes an addressing computer and software, a choice of printers (dot matrix, daisywheel and direct impression) and an automatic labeling system.

The price for the system ranges from \$3,000 to \$8,000. More information is available from Addressograph Farrington, Randolph Industrial Park, Randolph, Mass. 02368.

Executive Secretary II Software Update Targets Wang Laboratories VS Family

DOWNEY, Calif. — Minicomputer Interactive Systems, Inc. has announced office automation software for the Wang Laboratories, Inc. VS line of computers.

Executive Secretary II is said to include all the message management and personal calendar features of the vendor's existing Executive Secretary, with the following enhancements:

- A group secretary feature that can maintain a calendar and schedule or assign another user to access a system while

protecting selected items.

- A meetings scheduler to select meeting schedules and notify participants for confirmation.

- A status line to let a group secretary know if a user is in, out or unavailable and a corporate telephone directory available to each user.

Executive Secretary II is priced at \$3,500. More information is available from Minicomputer Interactive Systems, 9550 Firestone Blvd., Downey, Calif. 90241.

Editing Units Get WP Aid

BALTIMORE — Penta Systems International, Inc. has announced a stand-alone word processing package for its Pentacomm remote input/editing terminals.

Called Pentaword, the package includes programs to convert Pentaword word processing files to Pentacomm text files that can be transmitted to the firm's Superpal and Pentaquick host systems. Other features include merging and arithmetic functions for memos, invoices and financial statements.

The Pentaword package costs \$1,500 per terminal and each terminal costs from \$5,450, the vendor said from 1 E. Chase St., Baltimore, Md. 21202.

Smarterm II Tied to Apple

SUNNYVALE, Calif. — Advanced Logic Systems (ALS) has announced a software preboot program said to allow Apple Computer, Inc.'s Applewriter II and IIe to operate with ALS' new Smarterm II.

The interface program reportedly permits Applewriter II users to take advantage of Smarterm II's 80-col. board, which will allow a true screen display of the text being typed.

The preboot diskette will be available to Smarterm II users for a \$5 handling charge. ALS is located at 1195 E. Arques Ave., Sunnyvale, Calif. 94086.

Software Package 'Execmail' Runs on PDP-11s

LOS ANGELES — Executive Software, Inc. has announced an electronic mail software package that is said to provide electronic communications for both large and small companies.

Execmail, for use on Digital Equipment Corp.'s PDP-11 series, includes messages automatically transferred to a basket system for in, pending, out and wastebasket; a directory of users composed of names, job titles and distribution lists according to the user's needs; an ability to create and send documents or send already existing files in the user's account, including text files, graphics, video or binary programs, according to the vendor.

Depending upon options purchased, prices for the package range from \$3,500 to \$7,660, the vendor said. Executive Software is located at 2024 Hollyvista Ave., Los Angeles, Calif. 90027.

WP Aid Updated For DEC Micros

PASADENA — Compu-Tome, Inc. has enhanced its Ctos word processing package to allow Digital Equipment Corp. computers to run under DEC's P/OS on the 325/350 personal computers.

The enhanced version is known as Ctos/PC. It is written entirely in Macro-11 machine language for efficiency of memory usage and processing speed. It is menu-driven and said to be easily learned by non-DP personnel.

Functions include global search and replace, cut and paste, list processing, Ascii file handling, 132-col. document width, stored text libraries, right-justified margins, on-screen mathematics and user-defined keys to invoke special word processing functions.

A single-system license for Ctos/PC costs \$950. A turnkey VAX-compatible system is also available for \$9,950, Compu-Tome said from 234 E. Colorado Blvd., Pasadena, Calif. 91101.

E-Mail Package Fits DOS/VSE

PITTSBURGH, Pa. — Westinghouse Electric Corp. has announced an electronic mail package for users of IBM's DOS/VSE operating system.

Called Mailtronic, the package was designed for use with IBM's 4300 series processors and associated on-line terminals. The package offers features similar to external electronic mail systems. Messages are typed on a terminal, delivered immediately and can be viewed at the recipients discretion. Messages can be transferred to several persons simultaneously, the vendor said.

Options include a variable number of mail boxes and selectable levels of privacy. Furthermore, there are letter priority assignments, group routing lists, tutorial displays and prompts and password protection, the vendor said.

The package costs \$6,250 when used with Westinghouse's Westi teleprocessing monitor, and \$7,000 when used with IBM's CICS. The vendor is located at 2040 Ardmore Blvd., Pittsburgh, Pa. 15221.

IBM Announced... Telex Delivered.



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Telex 178	YES	YES	YES	35	YES	YES	YES	YES	YES	YES	YES	YES
IBM 3178	YES	YES	YES	2	NO	NO	NO	NO	NO	NO	NO	NO

The Telex 178 offers more and costs less than the IBM 3178.

For a demonstration of the 178, or to arrange an actual side-by-side comparison with IBM, give your nearest Telex representative a call. Or call John Hawkins, toll-free at 1-800-331-2623.

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U.S.-Japan Ventures In DP Market Make For Good Business

By Patricia Keefe
CW Staff

Despite fears of damaging competition from "Japan, Inc.," U.S. high-technology companies are finding it makes good business sense to form joint ven-

Analysis

tures with Japanese computer firms.

What sends U.S. firms to Japan in the first place is the quest for short-term profits, according to industry analysts. Opinions on the effect these ventures have on the domestic computer industry vary from one analyst to another. However, observers seem to agree that purchases of Japanese technology and equipment by U.S. firms such as IBM and Amdahl Corp. have a negative impact on, for example, the U.S. semiconductor market.

Accounting for the impetus to form international joint ventures, analysts
(Continued on Page 72)

Many U.S. Firms Have Japanese Ties

By Patricia Keefe
CW Staff

Many U.S. computer companies have business relationships covering a wide range of partnerships and objectives with Japanese firms:

- IBM has forged a joint venture with Matsushita Industrial Electric Co., whereby Matsushita will manufacture an IBM workstation based on the Japanese Kanji character set. IBM Japan has two joint ventures in Japan, one a dealership for low-end products, the other a leasing company started this year. Mitsubishi Electric Co. currently supplies IBM with a range of color video display tubes, according to IBM spokesman Ken Sayres. Despite its alleged part in the theft of IBM trade secrets, Hitachi Ltd. is still supplying IBM with 3200 Kanji printing subsystems.

(Continued on Page 72)

First-Quarter Returns Bring Both Good, Bad News

By Bill Laberis
CW Staff

First-quarter financial returns continue to exhibit a mixed bag of good and bad news as economic recovery continues moderately apace, at least in the U.S.

For the third consecutive quarter, Digital Equipment Corp. posted an earnings slide, this time a 26% dip to profits of \$80 million, compared with earnings of \$107 million in the same quarter a year ago.

Revenues at DEC rose slightly in the period to \$1.09 billion from \$1 billion, while profits over the first nine months of DEC's fiscal year were pegged at \$198 million, down considerably from nine-month earnings of \$295 million posted a year ago.

DEC blamed lower than anticipated

equipment sales and increased production costs for the results which, the company said, has stepped up spending on research and development. Customer orders were generally flat in the quarter. DEC also acknowledged that it had experienced product start-up delays in the early phases of volume production of its personal computer line [CW, Jan. 24].

NCR Corp. reported record quarterly profits of \$34 million, or \$1.15 per share, an 11% increase from last year's \$30.8 million quarterly earnings mark. Revenues, meanwhile, showed a 4% gain to \$781 million.

William Anderson, company chairman, said that "With the exception of Latin
(Continued on Page 70)

And Rosy Future

IBM Announces Higher Dividend

By Bill Laberis
CW Staff

BOSTON — The IBM annual meeting brought its own brand of sunshine to rain-soaked New England last week with the announcement of an increased quarterly dividend and a promise to shareholders of an "all-out participation in a worldwide

information processing industry that could triple in size to a trillion dollars a year by 1990."

The increased dividend, to 95 cents per share, was the first such increase in over four years. Some observers had expected IBM to announce a stock split, as shares of IBM have been trading in excess of \$100 per share for several months now. However,
(Continued on Page 76)

CPT Charges Ex-VP Disclosed Secrets

MINNEAPOLIS — CPT Corp., an office automation equipment manufacturer in Eden Prairie, Minn., has filed suit here against Stearns Computer Systems Corp., charging the company with improperly obtaining CPT trade secrets, including sales and marketing strategies.

The suit filed in District Court cites Robert Gallagher, former CPT vice-president of domestic sales who now holds a similar position with Stearns Computer. Stearns Computer was formed last year by another former CPT vice-president, Joseph Stearns.

Gallagher has been charged with violating a noncompetition agreement that CPT claimed barred him from either revealing
(Continued on Page 76)



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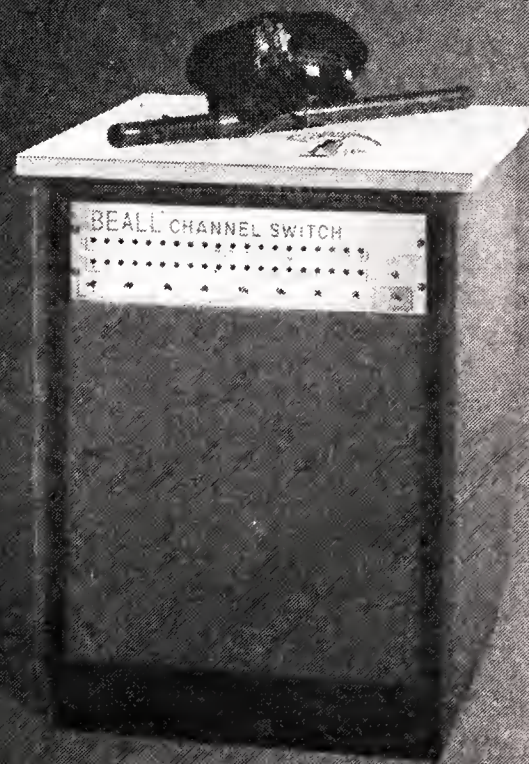
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Twenty-Eight Vendors Get GSA Contract for Micros

WASHINGTON, D.C. — The General Services Administration (GSA) has issued contracts to 28 vendors representing 32 product lines to sell microcomputers to the federal government under a pilot multiple award schedule effective April 1.

The pilot schedule is a complement to GSA's plans to have a private contractor operate a pilot store here [CW, April 18].

Use of the schedule will be limited initially to GSA, the Department of Agriculture and the U.S. Army. Extended participation to all federal agencies is planned for

July 1. The trial period will run through March 1984.

Under the contracts, government users can purchase desk computers at discounts ranging from 15% to 29% off the list price for microcomputers ranging from \$1,000 to \$10,000.

All ordering and billing under the schedule is to be handled by GSA. After selecting equipment, purchasing agencies will route their orders to GSA for forwarding to vendors. The vendors will ship equipment to the agency in question and bill GSA, which will bill the agency.

Vendors' Financial Results Are Mixed in First Quarter

(Continued from Page 69)

America, all regions showed gains, with the greatest strength coming from the U.S., Europe and the Far East. Comparing this year's first quarter with the first quarter of 1982, the U.S. dollar has appreciated an average of approximately 11% against other currencies. With half our business coming from abroad, this factor has continued to affect adversely not only our revenues and earnings, but also the dollar value of current incoming orders."

Burroughs Corp. reported a steep 47% earnings slide, with profits falling to \$30 million, or 71 cents per share, from last year's quarterly mark

of \$57 million, or \$1.35 per share. Revenues in the period also declined slightly, down to \$987 million from \$990 million.

Burroughs' results included a non-recurring gain of 11 cents per share from selling marketable securities and gains of 63 cents per share, or \$26 million, from the cumulative effect of an accounting change, the company reported.

Honeywell, Inc. also reported a nose dive in earnings, with profits of \$22 million, or 98 cents per share, compared with \$55 million, or \$2.48 per share, a year ago. However, the company said that the quarterly figures included a \$36 million capital gain. Revenues in the quarter increased slightly to \$1.3 billion from \$1.26 billion the same quarter in 1982.

According to Edson Spencer, company chairman and chief executive officer, Honeywell's "information business showed signs of improvement, but still faces a difficult year." Customer shipments in its Information Systems Division remained low, particularly international computer orders, Spencer said.

Apple Computer, Inc. continued booming along, reporting earnings up 73% to a record \$24 million, or 40 cents per share, compared with profits of \$14 million the same quarter last year. Revenues jumped 74% in the period to a record \$228 million, pushing Apple toward the billion dollar annual sales figure.

For the first six months of Apple's fiscal year, the company reported earnings gains of 74%, or \$47 million, over 1982, while revenues for the half year increased 67% to \$442 million.

Commenting on the company's product offerings and results, A.C. Markkula Jr., vice-chairman, said, "We are extremely pleased with the market acceptance and orders to date for our Lisa personal office system." Markkula also said worldwide sales were paced by the Apple IIE personal computer, introduced in January, and that the company has temporarily been unable to meet demand.

Earnings at mini-maker Prime Computer, Inc. fell 20% to \$8.5 million, or 27 cents per share, down from \$10.6 million, or 37 cents per share, a year ago. Revenues increased 17% in the period to \$120 million.

And AT&T reported that earnings fell nearly 14% in its first quarter to \$1.74 billion, or \$1.87 per share, down from \$2 billion, or \$2.40 per share, a year ago. Revenues in the period increased more than 7% to \$16.8 billion. Company officials said they had predicted the slide a month ago when AT&T sold 17 million new shares.

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Correction

The quarterly increase in IBM's revenues for the first quarter of 1983 was incorrectly given as 44% in the April 25 issue of *Computerworld*. Purchases of IBM products were up 44% in the quarter, while revenues increased 17.3%.

Two Accounting Firms to Sell Micro Products

In separate announcements recently, two major accounting firms have each begun marketing micro-computer software and systems to the general public and to other ac-

counting firms.

Coopers & Lybrand of New York announced it will release a library of accounting, tax and audit-related microcomputer software to other ac-

counting firms, beginning in Florida and expanding the effort later this year.

The packages will be available to certified public accountants on a time-sharing basis, the company said. The software consists of a series of individual programs said to be compatible with a number of micros running under Digital Research, Inc.'s CP/M and MP/M or Microsoft, Inc.'s MS-DOS operating systems.

Coopers & Lybrand said there are approximately 75 programs in the time-sharing library, encompassing accounting and auditing, health care, investment and financial analysis, statistical sampling and tax planning and analysis.

In Mesa, Ariz., Alexander Grant

and Co. announced it will market, install and support a family of micro-processor-based general business accounting systems. The announcement followed the completion of an agreement between the company and Cyma Corp.

The agreement calls for the marketing of Cyma's general ledger, accounts payable, accounts receivable, payroll and inventory systems.

A separate agreement will allow Alexander Grant to market Cyma's vertical market packages, including medical practice management, dental practice management, construction management, client accounting, orthodontic practice management and chiropractic practice management.

Executive Hiring Increasing In High-Tech Firms: Study

PALO ALTO, Calif. — Executive hiring among high-technology firms increased during the first quarter of 1983, according to the 45th quarterly National Executive Vacancy Index by Korn/Ferry International.

Specifically, hiring of senior executives within the electronics industry rose 9% compared to a year ago. Also, there has been an upturn in executive hiring within the semiconductor industries, said to be a leading indicator of the economic health of high-technology in general, a spokesman said.

The electronics industry comprised 12% of total executive demand, ahead of last year. The financial services organizations, however, lead in hiring with 27% of the total demand.

Korn/Ferry predicted continued growth in the demand for presidents and chief executive officers of smaller start-up high-technology companies, particularly in northern California where the majority of venture capital firms are headquartered.

Overall hiring nationally of executives earning \$75,000 or more annually dropped 2% compared to the first quarter of 1982. However, demand for senior executives in March was the highest in 18 months, said to be signaling the beginning of an economic upturn, the study noted.

The index cited three "key" indicators that reportedly show clearly the economy is moving out of a recession and into a recovery period:

- Hiring of sales and marketing managers rose 17% compared to the same period a year ago, showing that companies are beginning to think in terms of expansion and new product lines, the study said.

facturing was up 25%, said to be evidence that the heavy industrial industries are beginning to revive, according to Korn/Ferry.

- Hiring of financial officers, typically most in demand during a recession, has dropped, the study said.

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U.S. Vendors Forging Joint Japanese Ventures

(Continued from Page 69)

• Intel Corp. has a five-year cross-licensing, cross-compatibility and technology exchange agreement with Nippon Electric Co., primarily concerning certain controllers and peripheral equipment.

• IPL Systems, Inc. entered into an agreement with Mitsubishi last year to develop an IBM-compatible processor using Mitsubishi's computer-aided design and large-scale integration technology and IPL's design expertise. According to Lee Gendron, IPL's vice-president of OEM and technical operations, the arrangement is an equal partnership. "We both have the right to market or not [market] anything we work on and jointly develop," he said, adding that IPL's relationship with Mitsubishi is "very cost-effective."

• Amdahl Corp. uses a semiconductor developed and manufactured by Fujitsu in a computer that Amdahl designed and builds in the U.S. Founder Gene Amdahl, now of Trilogy Systems Corp., reportedly ran into financial difficulties at one point and sold some of his own stock to Fujitsu, according to Jack Hart, International Data Corp.'s director of Pacific operations. As a result, he added, Fujitsu now owns 40% of Amdahl.

Amdahl spokeswoman

Wendy Matthews acknowledged that Amdahl could have gone to an American firm, but that "senior management felt it [Fujitsu] was the best company to work with to achieve the best production possible for the profit of Amdahl." She said the two firms were partners in a "future technological agreement" that involved cross-licensing, financing and information exchanges.

• National Advanced Systems, Inc. no longer manufactures its own computers. Under a joint agreement with Hitachi, it repackages

and sells Hitachi's high-end, plug-compatible mainframes, providing sales, service and support.

• RCA Service Co. and Hitachi America, Ltd. announced an \$8.5 million agreement in March, under which RCA would market Hitachi's Digital Communications Controller, a third-generation private branch exchange, through its 180 U.S. sales offices.

• Sperry Corp. has numerous arrangements with Japanese firms, including two long-established joint ventures — Oki Univac Kai-

sha (OUK) for manufacturing and Nippon Univac Kai-sha (NUK) for marketing. Sperry reportedly is a top shareholder in OUK, which will assemble Sperry's 1100 mainframes in Japan, and has assembled terminals and some disk subsystem models for export to Sperry and peripherals for local [Japanese] marketing by NUK.

NUK is a marketing venture with Mitsui & Co., said to be one of Japan's top trading companies and one in which Mitsubishi holds a minimal share. NUK handles most of the Sperry line.

In 1982, Sperry signed a high-technology cooperative agreement with Mitsubishi, covering joint activities in

manufacturing, research and development and marketing computer systems. Reportedly, Mitsubishi may supply Sperry with peripherals and semiconductors as well.

• TRW Corp. and Fujitsu entered into "a true joint venture, formed and financed by both parties" in 1980, according to Hart, called The TRW-Fujitsu Co. (TFC). Originally, TFC was to consider the possibility of marketing Fujitsu's F-M series. However, the joint venture was plagued by a series of problems that included communication difficulties, software documentation and differences in cultural perspectives of U.S. market requirements.

U.S.-Japan Ventures Good Business Sense

(Continued from Page 69)

cited one key factor: faster delivery of quality, low-cost components and technology. In general, the desire to minimize costs in component purchases, coupled with an unwillingness to invest in long-term research at home, pointed some U.S. firms in the direction of Japan, analysts said.

Jack Hart, director of Pacific operations at International Data Corp., sees a trend of non-Japanese companies "really searching, looking for opportunities" to form partnership-type relationships with Japanese

firms. And from the number of U.S. companies currently aligned with Japanese firms, we need to understand more about [such relationships]," he added.

But other observers are convinced that the majority of U.S.-Japanese computer partnerships are born out of necessity. "It's difficult to do business with Japan; it's not something [U.S.] companies take lightly," according to Duane Kirkpatrick, chairman and research partner with San Francisco-based Robertson, Coleman, Stephens & Woodman.

Kirkpatrick said that U.S. firms are "quite willing" to spend more money at home, if they can get the same products they want within the same time frames specified. If not, they will ink pacts with Japanese firms in areas in which the Japanese offer leading-edge technology. He predicted the next generation of disk drives will be developed in Japan.

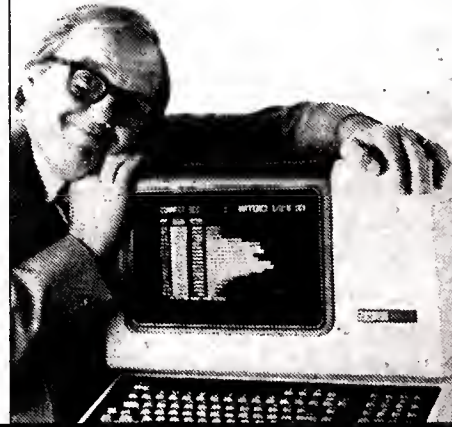
Bill Easterbrook, security analyst with Kidder, Peabody & Co., Inc., said that "In the majority of cases, it is true that U.S. firms could go to other U.S. manufacturers, except [in cases in which] they want to get into the Japanese market."

By the same token, there are several reasons for the Japanese wanting to enter such joint ventures. As a rule, when it comes to marketing, sales and support services, the Japanese are not as proficient as Americans, Hart said. Hitachi Ltd., for example, maintains U.S. distribution arrangements with National Advanced Systems, Inc. and RCA Service Co. Japanese companies "are more interested in building a market share [here] than they are in forming a partnership. They'll do anything they can to increase their visibility," Hart said.

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Thursday, June 23 & Friday, June 24

The Thursday and Friday conference program is divided into four major "tracks," but you are not required to sign up for a particular group of sessions. You may select the sessions you need from any of the 48 sessions available and create a conference program designed to suit your unique information needs. You may even choose to attend one day instead of two if you want. A detailed agenda will be sent to you prior to the conference for your advance planning, so you don't waste a minute!

Special General Session for Thursday Attendees:

The Revolt of the Masses: Micros and the Changing Role of DP.
(5:00-6:00 p.m.)

Dr. Michael Hammer, President, Hammer & Company

1. Personal Computing in a Corporate Environment

For Executives in large corporations who are involved in using micros in distributed data processing or as standalone executive workstations, the EMCE conference program includes:

Keynote: Increasing Corporate Productivity via the Personal Computer (Thurs., 9:00-10:00 a.m.)

Mayford Roark, Executive Director of Systems, Ford Motor Company

The Executive/Professional Workstation (Thurs., 10:00-11:00 a.m.)

Evelyn Wilk, Consultant, Arthur Andersen & Co.

DLP with Microcomputers (Thurs., 2:00-3:30 p.m.)

Moderator: Jerrold Eisen, President, Office Sciences International
Panelists: Phil Dixon, MIS Manager, Apple Computer; Robert A. Miller, Special Assistant to the Deputy Secretary of Treasury, U.S. Treasury Department

The Information Resource Center (Friday, 3:45-5:15 p.m.)

Moderator: Thomas Kosnick, Researcher, Stanford Business School;

Panelist: Alan Gross, Director of Systems, International Paper Company

The Role of Apple and IBM in Corporate Computing (Friday, 3:45-5:00 p.m.)

Moderator: David Bunnell, Publisher, "PC World"

New Issues of Confidentiality and Security in Organizational Information Processing (Friday, 9:00-10:00 a.m.)
Professor Alan F. Westin, Columbia University

Personal Computer Acquisition and Implementation Strategies (Friday, 10:00-11:00 a.m.)

Don L. Eddy, Principal, Office Futures Now, Inc.

Compatible Systems and Software for the IBM PC (Friday, 2:00-3:30 p.m.)

Moderator: Steve Cook, Technical Editor, "PC World"
Panelists: Chris Larson, Product Marketing Manager, MS/DOS, MicroSoft; Steve Flannigan, VP Software, Compaq Computer Corp.

2. Introduction to Microcomputing and its Applications

For Executives who are concerned with the selection and use of microcomputers primarily in smaller businesses, the EMCE conference highlights:

Keynote: The Personal Computer: The Mouse that Roared! (Thurs., 9:00-10:00 a.m.)

Lew Kornfeld, Director, Tandy Corporation

How to Buy a Personal Computer (Thurs., 10:00-11:00 a.m.)

Lawrence Govoni, Director, Govoni Microcomputer Training School, Boston, MA

Spread Sheet/Financial Applications (Thurs., 2:00-3:30 p.m.)

Moderator: Hannah Blank, Vice President-MIS, Chase Manhattan Bank

Panelists: Seneel Kelkar, Mktg. Mgr., Standalone Products, VisiCorp; Russell Warner, Product Mktg. Mgr., Enduser Products, MicroSoft

New and Future Trends in Personal Computing (Thurs., 3:45-5:00 p.m.)

John C. Dvorak, Editor, "InfoWorld"

Word Processing Packages for Personal Computers (Friday, 9:00-10:00 a.m.)

Susan Harmon, President, Transitions

DBMS on Personal Computers (Friday, 10:00-11:00 a.m.)

Adam Green, President, SoftwareBanc

A Look at Integrated Software Packages (Friday, 2:00-3:30 p.m.)
Moderator: Dan Coursey, Sr. Market Analyst, International Data Corporation

Panelists: Chris Morgan, VP, Communications, Lotus Development Corp.; Brian Fischer, Sr. Vice President, Context Management Corp.; Roy Folk, OEM Customer Mktg. Mgr., VisiCorp

Panel: Executive Personal Computer Success (Friday, 3:45-5:15 p.m.)

Moderator: Alan Sneider, Partner, Laventhol & Horwath

3. Technological Developments in Personal Computing

For Executives who wish to keep up with changing microcomputer technologies in mass storage, business graphics, operating systems, and more, the EMCE conference highlights:

Keynote: The Future of Personal Computer Software for Business (Thurs., 9:00-10:00 a.m.)

Dan Fylstra, Chairman, VisiCorp

What's New in Peripherals (Thurs., 10:00-11:00 a.m.)

Peter Burgess, President, Burgess Management Associates

Developments in Personal Computer Business Graphics (Thurs., 2:00-3:30 p.m.)

Moderator: Dave Needle, Sr. Writer, "InfoWorld"

Developments in Mass Storage Capabilities (Thurs., 3:45-5:00 p.m.)

Moderator: Will Zachmann, VP, Office of Technology Assessment, International Data Corporation

Utilities (Friday, 10:00-11:00 a.m.)

Haines Gaffner, President, LINK

Popular Programming Languages (Friday, 10:00-11:00 a.m.)

Gordon Eubanks, Vice President, Commercial Systems Division, Digital Research, Inc.

Operating System Selection: 8 to 16 Bit (Friday, 2:00-3:30 p.m.)

Moderator: Maggie Canon, Editor-in-Chief, "InfoWorld"
Panelists: Gordon Eubanks, VP-Commercial Systems, DRI; Jean Yates, President, Yates Ventures; Mark Ursino, OS Marketing Mgr., MicroSoft Inc.; Natalie Shuttleworth, Manager of OS Mktg., Apple Computer

Developments in Networking (Friday, 3:45-5:15 p.m.)

Moderator: Will Zachmann, VP, Office of Technology Assessment, International Data Corporation

Panelists: Mark Stallman, Dir., Mktg. Development, General Instrument Corp.; Art Simon, Director of Mktg., Commercial Services, Warner-Amex Cable Communications Inc.

4. Microcomputer Market Opportunities

For Entrepreneurs, Dealers, Distributors and Systems Houses, we'll offer sales and venture capital strategies you won't want to miss. Session highlights include:

Keynote: Retail Opportunities in the Personal Computer Marketplace (Thurs., 9:00-10:00 a.m.)

James Finke, President, Internetworx, Inc.

Software Packaging and Distribution (Thurs., 10:00-11:00 a.m.)

Will Loudon, Director of Marketing and Retail Communications, Micropro International

Raising Venture Capital for Software and R&D (Thurs., 2:00-3:30 p.m.)

Moderator: Jim Furneaux, Partner, L.F. Rothschild, Unterberg, & Towbin

Legal Issues for the Retail Distributor (Thurs., 3:45-5:00 p.m.)

Walter Klasson, Brown, Raysman & Millstein

Market Update: Competition from Japan (Friday, 10:00-11:00 a.m.)

Robert C. Wood, President, Robert Chapman Wood Company

Successful Training Strategies for Vendors and End Users (Friday, 2:00-3:30 p.m.)

Sue Cornwall, NEC Information Systems; Stephanie Rosenbaum, President, Tec-Ed

Delivering Good Maintenance, Service & Support (Friday, 3:45-5:15 p.m.)

John Harnett, Director of Planning and Development, TRW Customer Service Division

Selling the Corporate Account: Problems & Pitfalls (Friday, 9:00-10:00 a.m.)

Special Program for Educators

Saturday, June 25

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For Educators and Administrators, EMCE will hold a special seminar on Saturday, June 25th entitled Microcomputers in Education and which includes the following sessions designed to suit the unique needs of education:

Keynote: Computer Assisted Instruction in Education (8:30-9:30 a.m.)

Dr. Sylvia Charp, Editor-in-Chief, T.H.E. Journal

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Storage Mart Seen Expanding

CLEVELAND — The market for magnetic storage devices will grow by 16% per year through the mid-1980s, with annual sales reaching \$28 billion a decade later, according to a study by Predicasts, Inc.

The report, "Magnetic Storage Devices," cites two primary forces shaping demand within the storage market: unprecedented demand for data storage equipment of all types and intense industry competition to develop more cost-effective storage technologies.

Winchester disk drives and floppy disk drives will experience the most rapid growth among all types of magnetic storage devices, with the market for Winchester increasing by 28% per year through 1985 with

annual sales of \$7 billion, the report stated. Floppy disk drive units that are 5¼ in. will eventually capture 60% of the disk drive market and will grow by 29% annually through 1985, the report continued.

"Magnetic Storage Devices" is available for \$1,095 from Predicasts, 11001 Cedar Ave., Cleveland, Ohio 44106.

Wang Centralizes HRMS Group

LOWELL, Mass. — Wang Laboratories, Inc. has announced the centralization of development, support, maintenance and promotion of its Human Resource Management System (HRMS). The centralization marks the first time Wang has estab-

CPT Charges Former VP With Disclosure of Secrets

(Continued from Page 69)

company secrets or working for a competitor for two years.

CPT is asking for an injunction prohibiting Gallagher from working for Stearns Computer, Jerry Jenko, CPT vice-president of marketing and

sales, said.

No monetary damages are requested, he added.

The suit alleges that Stearns hired Gallagher to obtain secret information about CPT's network of independent word processor dealers. Court papers allege that "Gallagher's disclosure of CPT's proprietary and confidential information ... will cause irreparable damage to CPT."

The secret information reportedly includes data about independent dealers, customer lists, marketing plans and business strategies, including a manual said to deal with the establishment of a dealer network and a dealership that Gallagher is alleged to have taken with him when he left the company.

In a petition to the court asking that the suit be dismissed, Gallagher and Stearns Computer denied they have any secret CPT information.

lished software for its virtual storage information systems, a move designed to increase the company's visibility in the software marketplace.

The centralization marks the first time the company has established an independent organization that will be responsible for its own profit and loss, Wang said. While the HRMS group will retain responsibility for software product sales goals, sales personnel will continue to provide account management and control for hardware sales.

Higher Quarterly Dividend Announced at IBM Meeting

(Continued from Page 69)

er, John R. Opel, company chairman and chief executive officer, said there are no immediate plans for a stock split or any new offerings of IBM shares.

Opel told over 2,000 shareholders that IBM is well-poised to become the leader in every market in which it competes, from personal computers to large systems to storage devices. Opel attributed IBM's present and anticipated future successes to the leadership of his predecessor, Frank T. Cary, whom Opel praised at the start of the meeting.

"The large investments in capacity and productivity we started making in the mid-1970s are showing results — clear evidence we are accomplishing our goals," Opel said. He called Cary's growth strategy for IBM "courageous and confident," despite some lean profit years and a looming U.S. government antitrust suit against the company, a suit dismissed last year.

The chairman said indications are that IBM grew faster than the information processing industry in 1982, despite the worldwide recession. The company recently reported a first-quarter earnings gain of 24%.

Opel warned, however, that the worldwide economic climate throughout 1983 does not look as rosy as that in the U.S. Approximately half of IBM's business is transacted abroad.

Asked by a shareholder to comment on rumors of an announcement of a low-end personal computer, Opel gave the usual company reply of "no comment" on future plans.

Opel gave the usual company reply of "no comment" on future plans.

Locom Files Suit Against IBM: Charges Predatory Price Decreases

PHOENIX — Locom Corp., a San Jose, Calif., manufacturer of add-in memories, has filed a suit charging IBM with predatory price decreases designed to eliminate competition.

The suit, filed in U.S. District Court here, claims that IBM made a price reduction in excess of 50% on selected increments of its 3033 memory in order to eliminate competition from independent suppliers of plug-compatible memories. Locom supplies add-in memories for IBM's 3031, 3032 and 3033 series CPUs, as well as for the 370/158 and 370/168 systems.

According to Locom, between 6G and 8G bytes of 3033 memory will be added within three years of the price reduction.

If IBM can eliminate competition, the firm asserted, the mainframe manufacturer will be able to monopolize a market worth \$100 million.

Locom is claiming unspecified

damages against IBM in three states, Arizona, California and Minnesota. The discriminatory nature of IBM's pricing practices, according to Tom Palfi, Locom's president, is demonstrated by IBM's unwillingness to reduce prices on the increment of memory not susceptible to independent suppliers, namely the 4M-byte minimum required with the central processing unit.

"Furthermore, although prices were reduced on other 3033 features not available outside IBM, these reductions were limited to the 15% to 25% range and have not reached the level applied to the 3033 memory increments where outside competition exists," Palfi claimed. He called the IBM pricing action "predatory" and said it cannot be justified by any legitimate business reason.

A spokesman for IBM said the company considered the suit to be "totally without merit."

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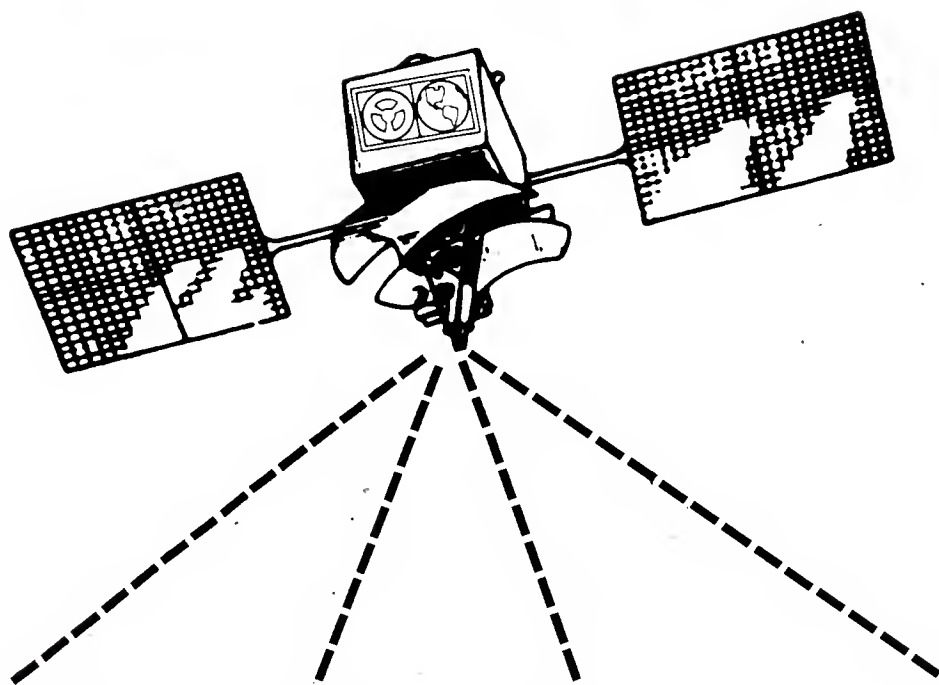
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We recently did a study of *Computerworld* subscribers to determine their level of involvement and interest in communications. Of the 84% now using or planning to use communications equipment and services, 72% are personally involved in its selection and/or implementation. We found that these subscribers depend on *Computerworld* for communications information and prefer its coverage by more than 4 to 1 over the next publication in the field. This segment of our audience has a critical need for in-depth information on the constantly changing technology of communications.

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Remember to look for *Computerworld On Communications* on May 18th and again on September 28th.

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Forecasts & Findings

Japanese Make Fax Move

The Japanese have moved to dominate the facsimile business in the U.S. with a degree of rapidity and completeness that makes their penetration of the automotive industry look slow and shallow, according to **The Market for Facsimile Equipment: 1982-1986** by Venture Development Corp.

The concern of America's companies "is no longer over whether there is a market for facsimile, but over who can best sell Japanese equipment to American users," the report said. In 1981, the installed base was comprised of 9.6% of units marketed by foreign companies, 9% imported and marketed by U.S. OEMs and 81.4% produced and mar-

keted domestically. By contrast, shipments in 1981 were only 52.8% domestically produced. In 1982, the imported units accounted for well over 50% of the shipments; and soon, the report predicts, the marketplace will purchase almost exclusively machines that are foreign-produced.

Priced at \$2,790, the study is available from Venture Development at 1 Washington St., Wellesley, Mass. 02181.

Micro Business Software

The market for microcomputer business applications software will top \$7 billion by 1987, reflecting rapid expansion in all segments. The dramatic growth in both company and market size in the next few years will generate more vertical integra-

tion, in-house support, program testing, captive distribution channels and sophisticated development tools, according to **Microcomputer Business Applications Software** by Creative Strategies International (CSI).

Although the large business market now accounts for most business software sales, the small business market will become more important within two years, with growth fueled by improving computer literacy, the availability of more user-friendly programmable software, more powerful microprocessors and larger memories at affordable prices, the report said. Demand in the international markets is also on the rise, stimulated by the previously low use of computers by both large and small

businesses outside the U.S. According to CSI, leading U.S.-based software producers report between 10% and 20% of their shipments are sold to non-U.S. markets.

The study costs \$1,450 from CSI, Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

Office System Sales to Rise

U.S. sales of integrated office information systems will jump from an estimated \$1 billion in 1983 to \$23 billion (constant dollars) in 1988, according to **The U.S. Office Automation Market, 1983-1988: The Evolution Toward Integrated Information Processing** by Arthur D. Little, Inc. The report projects growth in the total U.S. market for office automation equipment, exclusive of mainframe or small business computers, from an estimated \$11.3 billion in 1983 to \$36.6 billion in 1988. That represents an overall average growth rate of 26%, with integrated office information systems leading the way, the report said. Software will be the key to market growth by the early 1990s.

However, widespread adoption of totally integrated systems will be delayed until after 1985, largely because prospective customers are not ready for them, due to organizational problems, the report added. Most medium-size to large companies are expected to have solved those problems by 1988 and will then be integrating their office automation systems with their telecommunications and DP systems. Another reason for the delay in implementing integrated office systems is the relatively high cost of such systems.

Priced at \$2,500, the report is available from Arthur D. Little, 25 Acorn Park, Cambridge, Mass. 02140.

Users Turning to Leasing

Motivated by attractive cash-flow and tax advantages, a growing number of U.S. equipment users are turning to leasing as an alternate means of financing equipment acquisitions. As a result, the U.S. leasing industry can expect to maintain growth in excess of 11% per year through 1990. In dollar terms, this will translate into market expansion from less than \$40 billion in 1981 to over \$61 billion in 1985 to nearly \$106 billion by the end of the decade, according to **U.S. Capital Equipment Leasing Markets** by Predicasts, Inc.

Leasing is expected to be most attractive to businesses involved in equipment acquisition situations containing any of three essential elements: a disproportion between equipment cost and earnings or available cash or credit; a disproportion between tax benefits generated by a particular equipment acquisition and the income tax liability of the potential user; and anticipation of early equipment obsolescence, the report said. Robotic equipment leasing, according to the report, is in the midst of a tremendous growth period, which is expected to continue to the end of the decade, reaching \$65 million in 1985 from \$10 million in 1981.

The report, No. 292, costs \$1,095 from Predicasts, 11001 Cedar Ave., Cleveland, Ohio 44106.

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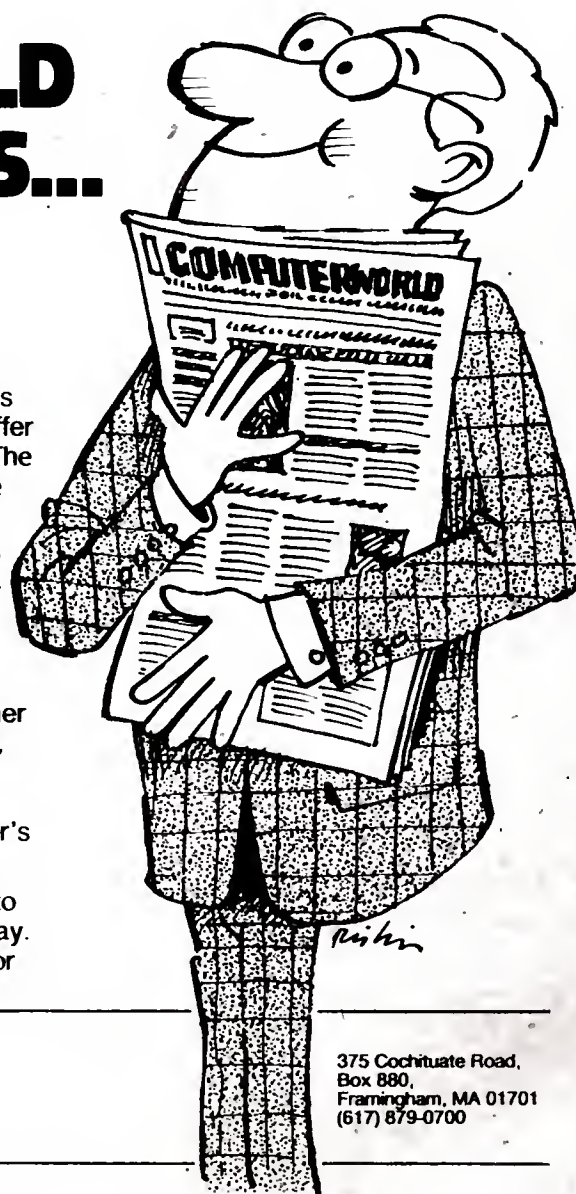
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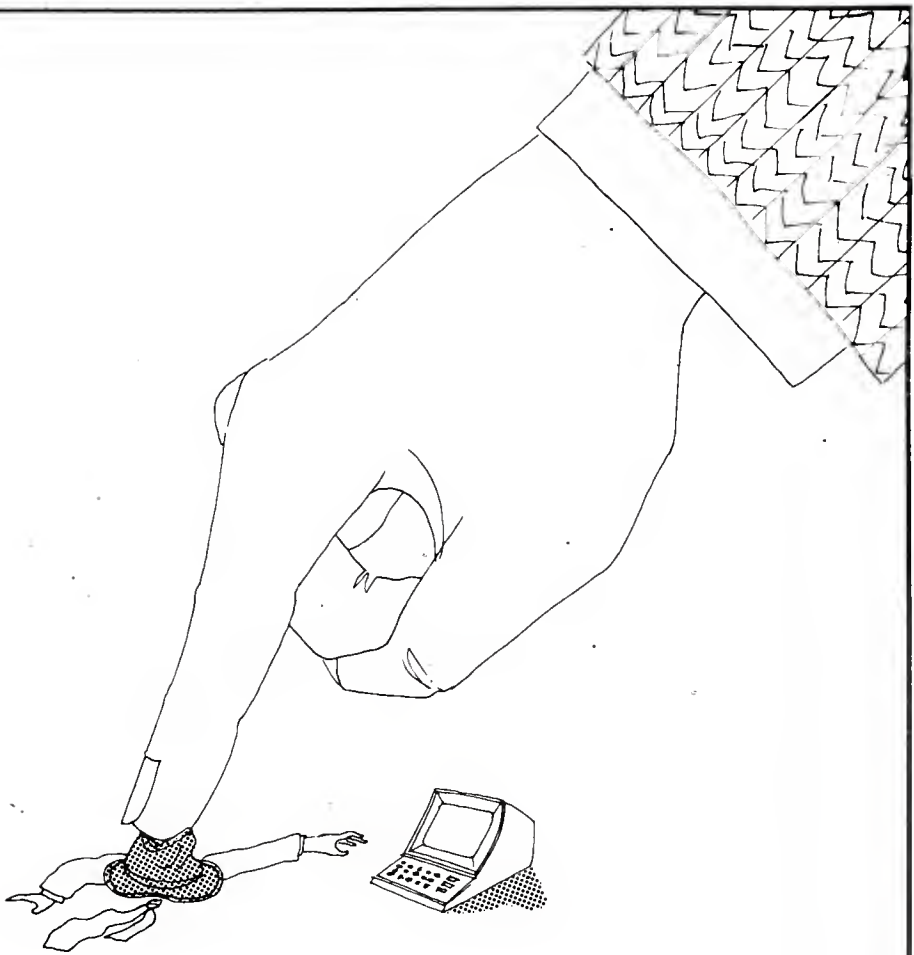
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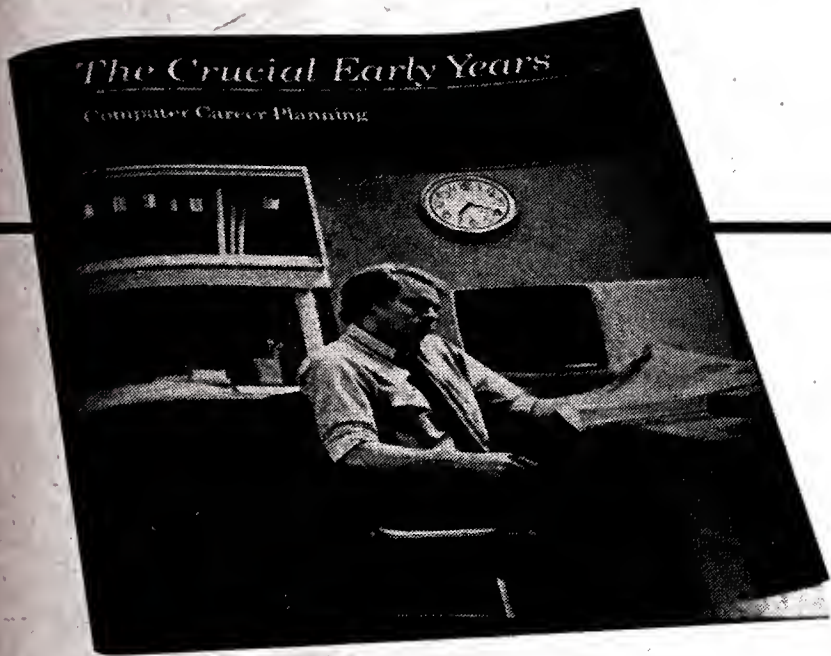
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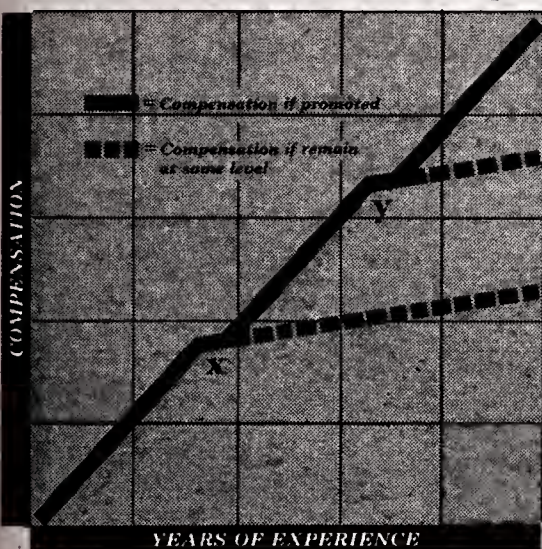
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Application closing date: May 25, 1983. May be extended without notice if qualified applicant not available. Send detailed resume, and the names, addresses and telephone numbers of three professional references to:

G. Trujillo, Chairman
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c/o Testing & Evaluation
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Persons interested in the position are requested to submit applications or nominations to Dr. Warren W. Brandt, V.P. for Gen. Adm., University of Maryland, Adelphi, Md. 20783. Evaluation will begin on May 25, 1983.

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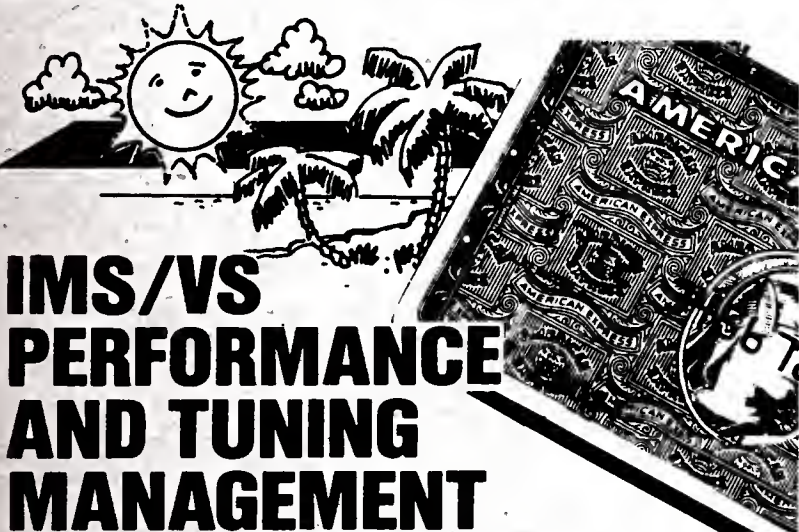
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Interested applicants should send letter of introduction, resume & 3 letters of reference to: Les Singletary, Director of Computing Services, Southeastern Louisiana University, Box 430, University Station, Hammond, LA 70402. Deadline for applications is May 27, 1983. Southeastern Louisiana University is an equal opportunity employer.

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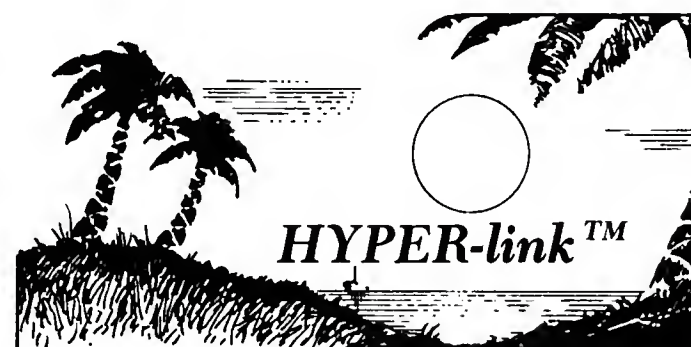
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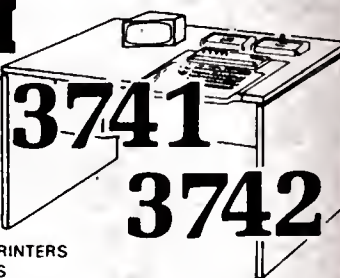
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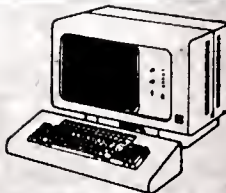
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<div>IBM KEYPUNCHES REFURBISHED & QUALIFIED FOR IBM MAINTENANCE</div> <div></div> <div>20% OFF</div> <div><table><tr><td></td><td>SALE</td><td>LEASE</td></tr><tr><td>026</td><td>\$750</td><td>\$35</td></tr><tr><td>029 (A22)</td><td>Call</td><td>Call</td></tr><tr><td>029 (B22)</td><td>Call</td><td>Call</td></tr><tr><td>029 (C22)</td><td>Call</td><td>Call</td></tr><tr><td>129 (3)</td><td>Call</td><td>Call</td></tr></table></div>		SALE	LEASE	026	\$750	\$35	029 (A22)	Call	Call	029 (B22)	Call	Call	029 (C22)	Call	Call	129 (3)	Call	Call	<div>IBM INTERPRETERS IBM REPRODUCERS IBM COLLATORS REFURBISHED & QUALIFIED FOR IBM MAINTENANCE</div> <div><table><tr><td></td><td>SALE</td><td>LEASE</td></tr><tr><td>085</td><td>\$1200</td><td>\$ 60</td></tr><tr><td>087</td><td>\$2500</td><td>\$150</td></tr><tr><td>088</td><td>\$2500</td><td>\$150</td></tr><tr><td>514</td><td>\$1800</td><td>\$ 70</td></tr><tr><td>519</td><td>\$2000</td><td>\$ 75</td></tr><tr><td>548</td><td>\$1500</td><td>\$ 60</td></tr><tr><td>557</td><td>\$3500</td><td>\$125</td></tr></table></div>		SALE	LEASE	085	\$1200	\$ 60	087	\$2500	\$150	088	\$2500	\$150	514	\$1800	\$ 70	519	\$2000	\$ 75	548	\$1500	\$ 60	557	\$3500	\$125	<div>BURROUGHS B20 SMALL BUSINESS COMPUTER</div> <div></div> <div>EASY TO INSTALL & OPERATE DEPENDABLE SOFTWARE COMPLETE SUPPORT CALL FOR DETAILS</div>	<div>NEW PRODUCT & SERVICE</div> <div>Completely Remanufactured Disk Packs At A Manufactur- er Approved Facility. 10 Year Warranty on Sales & 5 Year Warranty on Repairs.</div> <div>200 Meg \$299</div> <div>CALL FOR QUOTES</div>	<div>IBM SORTERS REFURBISHED & QUALIFIED FOR IBM MAINTENANCE</div> <div></div> <div><table><tr><td></td><td>SALE</td><td>LEASE</td></tr><tr><td>082</td><td>\$ 750</td><td>\$ 75</td></tr><tr><td>083</td><td>\$1495</td><td>\$ 65</td></tr><tr><td>084</td><td>\$2495</td><td>\$150</td></tr></table></div>		SALE	LEASE	082	\$ 750	\$ 75	083	\$1495	\$ 65	084	\$2495	\$150
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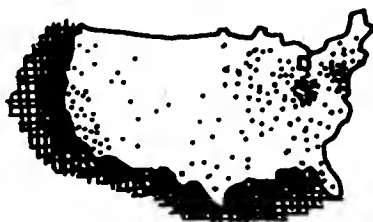
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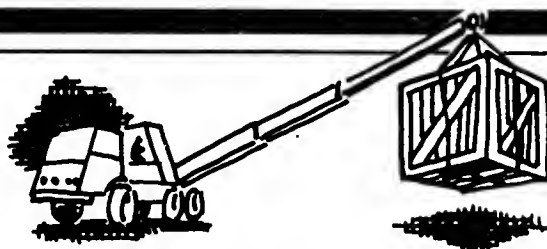
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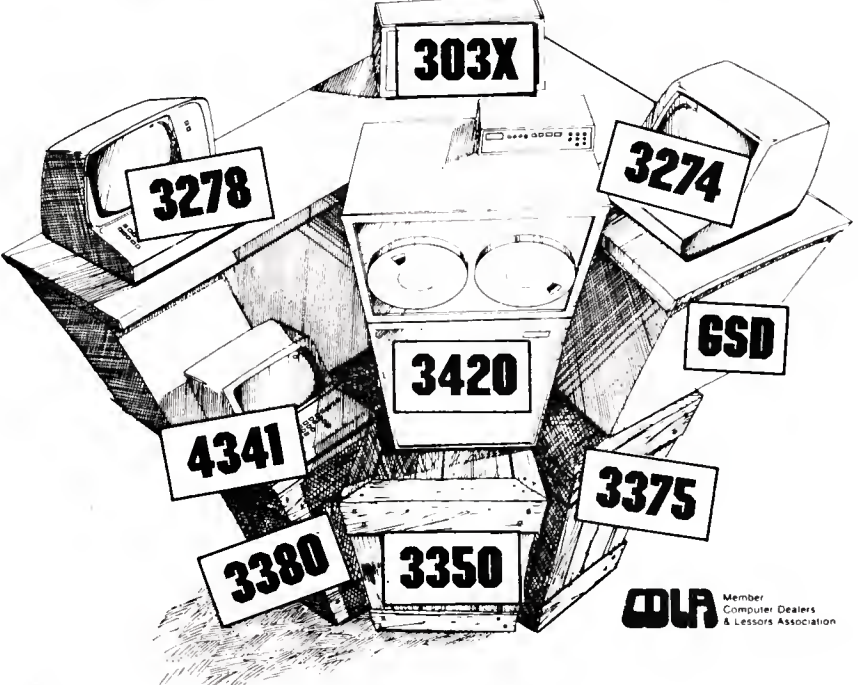
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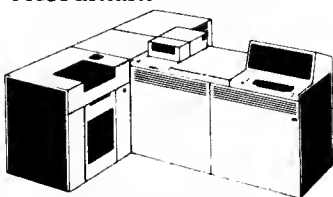
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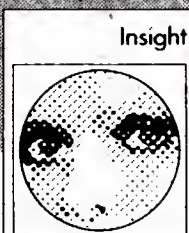
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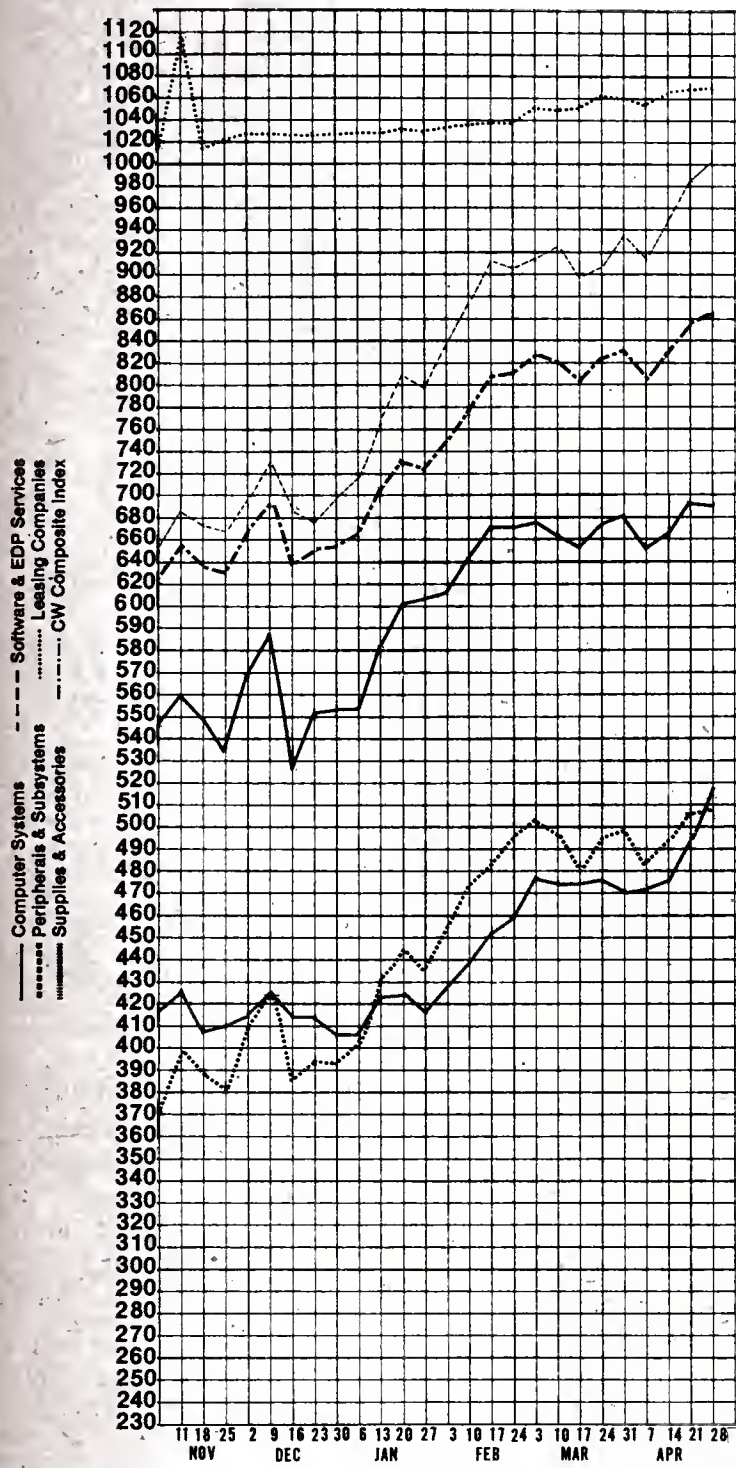
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Computerworld Stock Trading Summary

All statistics compiled,
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by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

CLOSING PRICES WEDNESDAY, APRIL 27, 1983

X C H	PRICE					WEEK PCT CHNGE
	1982-83 RANGE (1)	CLOSE APR 27 1983	WEEK NET CHNGE			
COMPUTER SYSTEMS						
A	AMDAHL CORP	17- 45	43 7/8	+2 7/8	+7.0	
N	BURROUGHS CORP	28- 48	46 1/2	+ 7/8	+1.9	
O	COMPUTER AUTOMATION	7- 17	10 5/8	- 7/8	-7.6	
A	COMPUTER CONSOLES	15- 44	38 1/2	-1 7/8	-4.8	
N	CONTROL DATA CORP	21- 52	47 5/8	-2 3/4	-5.4	
N	CRAY RESEARCH INC	20- 48	38 1/4	- 1/8	-0.3	
N	DATA GENERAL CORP	20- 73	73 1/4	+7 5/8	+11.6	
N	DATAPoint CORP	11- 36	19 1/8	-1 5/8	-7.8	
N	DIGITAL EQUIPMENT	82-132	118	-9 3/8	-7.4	
A	EEOC INC	6- 14	13 1/2	+ 1/2	+3.8	
N	ELECTRONIC ASSOC.	5- 12	8 1/4	+ 3/8	+4.2	
N	FLOATING POINT SYST	16- 38	30 1/2	-3 7/8	-11.2	
N	FOXBORO	22- 43	36 1/4	-2	-5.2	
O	FULCRUM COMP ORP	1- 3	1 1/4	0	0.0	
O	GENERAL AUTOMATION	3- 10	8 3/4	- 1/4	-2.7	
N	HARRIS CORP	20- 51	42 3/8	+ 3/8	+0.8	
N	HEWLETT-PACKARD CO	38- 87	75 1/4	-4 1/4	-5.3	
N	HONEYWELL INC	80-104	104 1/4	+ 1/4	+0.2	
N	IBM	57-117	118	+ 7/8	+0.7	
O	IPL SYSTEMS INC	5- 11	8	0	0.0	
O	MAGNUSON COMP SYSTB	2- 5	3	0	0.0	
N	MANAGEMENT ASSIST	7- 18	14 1/4	+ 3/8	+2.7	
O	MINI-COMPUTER SYST	1- 2	2 1/8	+ 1/4	+13.3	
N	MODULAR COMPUTER SYS	6- 15	13	- 7/8	-6.3	
N	MOHAWK DATA SCI	10- 15	15 7/8	-1 1/8	-6.6	
N	NCR	38-120	117	0	0.0	
N	PERKIN-ELMER	17- 33	23 7/8	-1 7/8	-7.2	
N	PRIME COMPUTER INC	16- 45	31 3/4	+ 1/2	+1.5	
N	SPERRY CORP	21- 39	36 3/8	- 1/8	-0.3	
O	TANDEM COMPUTERS INC	14- 34	28 7/8	+1 1/4	+4.5	
N	TEXAS INSTRUMENTS	71-176	145 7/8	-14 3/8	-8.8	
A	WAND LABS "B"	13- 37	37	+1 5/8	+4.5	
A	WAND LABS "C"	11- 38	37 1/4	+1 1/2	+4.1	
LEASING COMPANIES						
O	BOOTHE FINANCIAL CP	22- 37	37	0	0.0	
N	COMPTONSCO INC	7- 30	28 1/2	+1 1/4	+4.4	
B	COMMERCE GROUP CORP	1- 1	1 1/4	0	0.0	
O	COMPUTER INVSTRS ORP	1- 2	1 1/2	0	0.0	
O	CONTINENTAL INFO SYB	5- 22	20 1/4	+ 1/2	+2.5	
N	OFF INC	5- 14	12 3/8	- 1/2	-3.8	
O	ITEL	1- 3	1 1/8	0	0.0	
O	LEASPCORP	1- 2	1 1/8	0	0.0	
N	U.S. LEASING	18- 47	48 3/4	+2 1/8	+4.7	

E X C H	1982-83 RANGE (1)	CLOSE APR 27 1983	PRICE		WEEK NET CHNGE	WEEK PCT CHNGE
			1982-83 RANGE (1)	1983 APR 27		
O COMPUTER DEVICES INC	4-21	13 7/8		-1 3/4	-11.1	
O COMPUTER TRANSCIVER	4-12	10 1/4		-1 1/8	-9.8	
N COMPUTERVISION CORP	19-45	36 3/4		-1	-2.6	
N CONRAC CORP	21-37	35 1/2		+ 5/8	+1.7	
A DATA ACCESS SYSTEMS	1-4	1 1/8		0	0.0	
A DATAPRODUCTS CORP	18-41	23 1/2		- 5/8	-2.5	
A DATARAM CORP	5-12	9 3/8		- 3/4	-7.4	
O DATUS INC	2-12	11 7/8		+ 3/4	+6.7	
O DAVID JAMISON CARLYL	2-7	3 1/4		- 1/4	-7.1	
O DECISION DATA COMPUT	3-14	13 1/4		+ 3/4	+6.0	
O DELTA DATA SYSTEMS	1-4	3 1/4		0	0.0	
N ELECTRONIC M & M	5-10	9 1/4		+ 1/2	+5.7	
O EVANS & SUTHERLAND	10-50	40 1/4		+7/8	+2.2	
O GANDOLF TECHNOLOGIES	10-22	13 1/4		- 3/8	-2.7	
N GEN'L DATA COMM IND	8-19	17 1/4		- 1/8	-0.7	
O GENERAL TERMINAL CP	0-2	7/8		0	0.0	
O GREAT SOUTHWEST IND	2-5	1 1/2		0	0.0	
N HAZELTINE CORP	22-71	88 3/8		+1 3/8	+2.0	
O ICOT CORP	3-10	8		- 1/4	-3.0	
O INFORMATION INTL INC	10-22	18 3/4		-2 1/4	-11.8	
O INTEL CORP	21-48	47 3/4		+ 3/4	+1.5	
O IPL SYSTEMS INC	5-11	8		0	0.0	
A LUNDY ELECTRONICS	7-16	14 1/4		+ 1/4	+1.7	
A MSI DATA CORP	14-36	18 1/8		+ 3/8	+2.1	
O NETWORK SYSTEMS CORP	15-47	46 7/8		+2 1/4	+5.0	
O OMEX	3-5	4		0	0.0	
N PARADYNE CORP	20-30	24 7/8		+ 1/8	+0.5	
A PENRIL CORP	7-13	10 1/8		- 1/4	-2.4	
O RAMTEK CORP	12-26	22 1/4		- 1/4	-1.1	
N RECOGNITION EQUIP	4-15	14 1/4		+ 1/8	+0.8	
O SCAN DATA	1-3	3 1/8		0	0.0	
N STORADE TECHNOLOGY	18-33	21 1/2		+1 7/8	+9.5	
O SYKES DATATRONICS	8-27	9		-1 1/8	-11.1	
A T BAR INC	7-14	10 7/8		- 5/8	-5.4	
A TAB PRODUCTS CO	8-26	24 3/4		- 3/4	-2.9	
A TEC INC	8-12	8 3/8		+ 1/2	+8.3	
N TEKTRONIX INC	34-75	65 1/2		- 3/8	-0.5	
N TELEX	5-27	23 1/4		- 1/4	-1.0	
O TESDATA SYSTEMS CP	3-11	10 7/8		+ 7/8	+8.7	
N TIMEPLEX INC	7-24	22 3/4		+ 3/4	+3.4	
O VISUAL TECHNOLOGY	8-24	23		0	0.0	
O WILTEK INC	1-4	2 7/8		+ 1/4	+8.5	

SUPPLIES & ACCESSORIES

N AMERICAN BUS PRODS	11-27	25		-1 1/2	-5.8	
O BALTIMORE BUS FORMS	1-2	3/4		0	0.0	
N BARRY WRIGHT	13-27	26 1/4		+ 3/8	+1.4	
O CYBERMATICS INC	1-1	1 1/4		0	0.0	
A DUPLEX PRODUCTS INC	12-25	25 1/4		+2 1/8	+8.1	
N ENNIS BUS. FORMS	18-35	34 1/8		+ 3/8	+1.1	
N 3M COMPANY	48-88	85 1/4		+1	+1.1	
N MOORE CORP LTD	28-51	50 7/8		+2 1/4	+4.6	
N NASHUA CORP	8-18	18 5/8		+4 1/2	+37.1	
O STANDARD REGISTER	32-98	95		+1	+1.0	
N WALLACE BUS FORMS	22-58	55 5/8		+1 5/8	+3.0	

E X C H		-----PRICE-----			
		1982-83	CLOSE	WEEK	WEEK
		RANGE	APR 27	NET	PCT
		(1)	1983	CHNGE	CHNGE
SOFTWARE & EDP SERVICES					
O	ADVANCED COMP TECH	1- 6	4 3/4	- 3/4	-13.6
O	ADVANCED SYSTEMS INC	9- 24	24	+1	+4.3
O	AGS COMPUTERS INC	7- 22	18 3/4	- 1/4	-1.3
O	AMERICAN SOFTWARE	22- 25	25 1/4	+3 3/4	+17.4
N	ANACOMP INC	9- 23	18 1/8	-1 5/8	-8.2
O	ANALYSTS INTL CORP	5- 11	10 1/4	- 1/4	-2.3
A	APPLIED DATA RES.	8- 30	29 5/8	+2 3/4	+10.2
O	ASK COMPUTER SYSTEMS	12- 36	31	-4 1/4	-12.0
S	ASTRADYNE COMP IND	1- 6	5 1/8	+ 5/8	+13.8
N	AUTOMATIC DATA PROC	21- 40	35 1/8	-1 3/8	-3.7
O	CGA COMPUTER ASSOC	5- 14	13 1/4	+ 1/4	+1.9
O	COMPUTER ASSOC INT'L	12- 57	54	+3	+5.8
O	COMPUTER HORIZONS	2- 17	19 1/2	- 1/4	-1.2
O	COMPUTER NETWORK	4- 10	9	- 1/8	-1.3
N	COMPUTER SCIENCES	11- 23	17 7/8	- 1/8	-0.8
O	COMPUTER TASK GROUP	8- 19	15 1/4	+ 3/4	+4.0
O	COMPUTER USAGE	2- 22	16 3/4	+1 1/2	+9.8
O	COMPUTONE SYSTEMS	15- 38	23	0	0.0
O	CONSERV CORP	11- 20	11 1/4	-1 1/2	-11.7
O	CONSHARE	6- 13	10 3/8	- 1/8	-1.1
N	CULLINET SOFTWARE	12- 40	39	- 1/4	-0.6
O	CYCARÉ SYSTEMS INC	9- 21	21	+3 3/4	+21.7
O	DATA DIMENSIONS INC	1- 2	3/4	0	0.0
O	DATATAB	0- 2	3/4	0	0.0
O	DYATRON CORP	2- 4	3 1/4	0	0.0
N	ELECTRONIC DATA SYST	19- 60	58 1/2	-1 1/2	-2.5
N	INFORMATICS INC	10- 31	28 3/4	-1	-3.3
O	INSYTE CORP	1- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/8	0	0.0
O	KEANE ASSOCIATES	4- 13	12	+1 1/4	+11.6
A	LOGICON	12- 37	37	+1 3/8	+3.8
O	MNGT SCI AMER INC	8- 28	26 3/4	+ 3/4	+2.8
O	MATHEMATICA INC	12- 23	22 1/2	+1 1/2	+7.1
O	MATHEMATICAL APP GRP	12- 22	19 3/8	- 1/8	-0.8
O	NATIONAL DATA CORP	5- 24	23 7/8	+1 1/2	+6.7
O	PANBOPHIC SYSTEMS	8- 25	24 1/8	+2 3/8	+10.9
N	PLANNING RESEARCH	6- 17	17	+ 1/8	+0.7
O	POLICY MGMT SYSTB CP	36- 59	57 3/4	+3	+5.4
O	PROGRAMMING & SYS	1- 4	3 1/2	- 1/8	-3.4
O	REYNOLDS & REYNOLD	17- 43	42 3/4	+4 1/4	+11.0
O	SEI CORP	11- 31	31	+5	+19.2
O	SHARED MEDICAL SYST	13- 37	36 7/8	+ 1/2	+1.3
O	SCIENTIFIC COMPUTERS	6- 13	11 3/4	0	0.0
O	SOFTWARE AD	5- 17	7 7/8	- 1/4	-3.0
N	TYMSHARE INC	12- 30	18	-1 7/8	-8.4
A	URS CORP	5- 14	12 1/2	-1	-7.4
N	WYLY CORP	7- 13	11 7/8	0	0.0

PERIPHERALS & SUBSYSTEMS

P	AM INTERNATIONAL	2	8	5 1/2	+1 5/8	+44.2
A	ANDERSON JACOBSON	9- 26	19 1/2	0	0	0.0
O	AUTO-TROL TECHNOLOGY	8- 21	14 1/4	- 3/8	-2.5	
O	BANTREC INC	7- 33	16 1/2	-1	-5.7	
A	BEEHIVE INT'L	4- 11	10 1/4	+ 1/4	+2.5	
A	BOLT, BERANEK & NEW	13- 46	45	+1 7/8	+4.3	
O	CAMBEX CORP	2- 4	2	0	0.0	
N	CENTRONICS DATA COMP	6- 20	18 3/4	+ 1/8	+0.6	
A	CETEC CORP	4- 10	8 1/8	- 5/8	-8.4	
O	COGNITRONICS	2- 14	12 3/4	- 5/8	-4.8	
O	COMPUTER COMMUN.	1- 2	1 3/4	0	0.0	

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4. Are your systems truly online so all of our information is current?

How many of your systems are online? How secure are they?

5. Will my company have to be the one that discovers the bugs in your brand new system?

Just how long have your systems actually been used, and how have they been tested?

6. Will you update your systems as technology advances and regulations change?

What are some of your most recent updates? Will you keep us current on regulatory changes?

7. Do your systems really do everything you say they will?

Or will we have to change them or add to them to get the features we want?

8. How long have you been in business?

What are your revenues? What is your growth record? Where will your company be five years from now?

9. How many systems has your company installed?

How many of these were installed in the past six months? How many of your earlier customers are still using—and liking—your systems?

10. Do your financial systems handle unlimited foreign currencies?

Do your financial systems use a common set of currency exchange rates?

11. Can you link our executives' computers directly to the mainframe—so they can get their own information?

Is that software available right now?

12. How will you make sure our own people thoroughly understand your system?

Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?

13. How many of your people specialize in software for my industry?

How many accountants work for you? Human resource specialists? Manufacturing experts?

14. Do your systems have built-in features that make them easier to use?

What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?

15. As my business changes, will your system be flexible enough to change with it?

Or will we have to pay a lot to revamp it? Or even regenerate it?

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- | |
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| 5. Capital Expenditure Tracking |
| 6. Forecasting & Modeling |
| 7. Accounts Receivable |
| 8. Foreign Exchange |
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